

*December 1931*

# TECHNOLOGY REVIEW



# technology review

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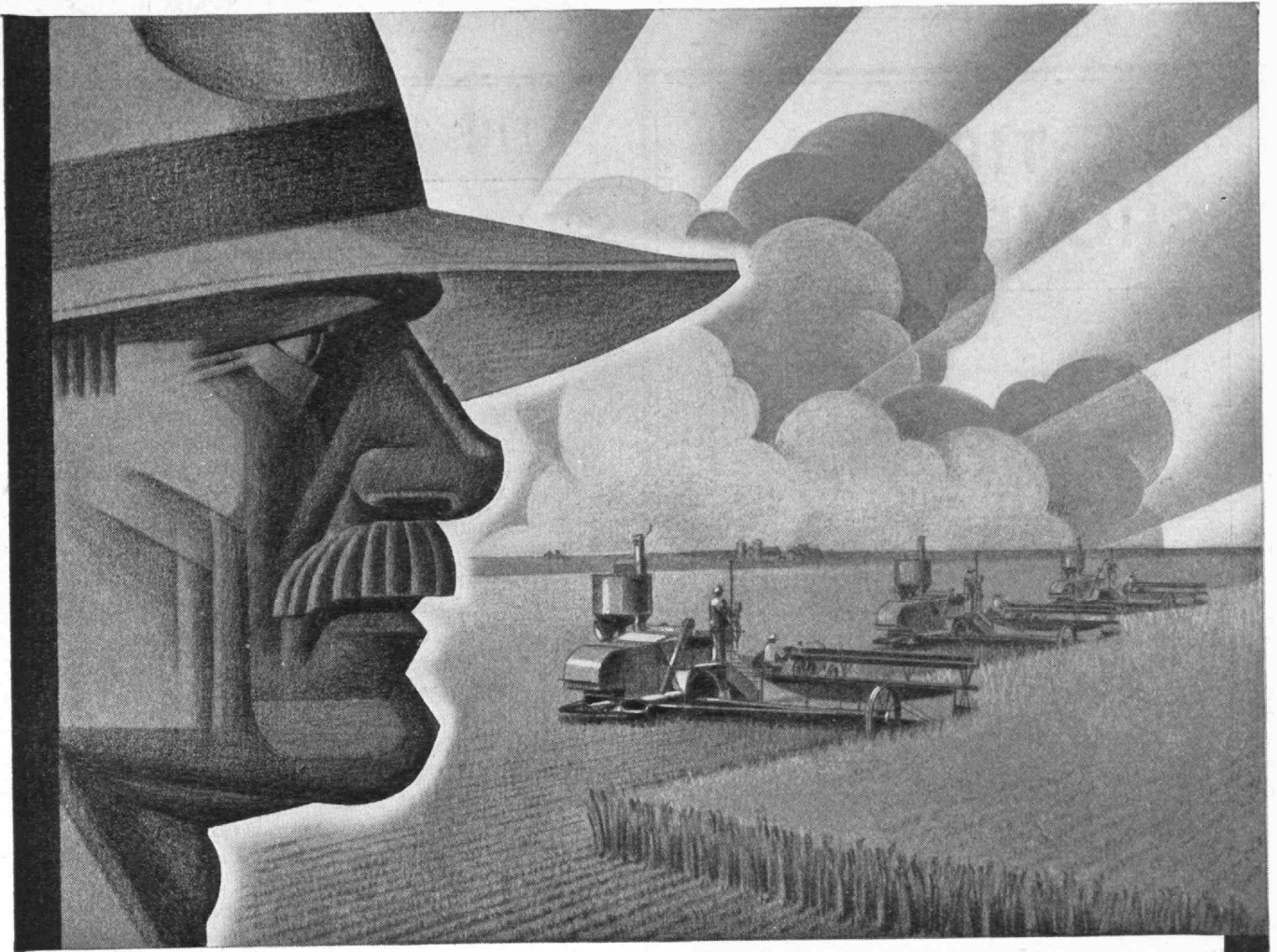
For the last 30 years, college graduates in the employ of the General Electric Testing Department have played an important part in the development of newspaper equipment. Here they gain experience which enables them to apply electricity to the advancement of this and countless other industries.

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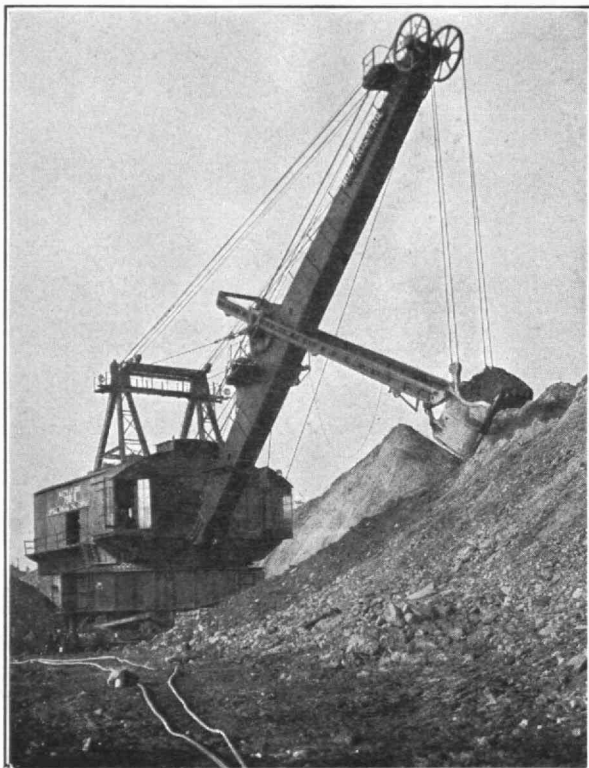
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## THE TABULAR VIEW

SO MUCH misleading information about nutrition has been distributed to the American reading public that the average layman is hard put to discriminate between the genuine and spurious. The Review asked Dr. MORRIS FISHBEIN, Editor of the *Journal* of the American Medical Association, to prepare a paper which would help the intelligent reader to a sound and sane attitude toward food and to warn him against the charlatanism and misrepresentation that beset all of us on every side. Too many people think of food in terms of quantity only, yet nutritional chemists are proving beyond all doubt that the quality of foods has an enormous effect on the human economy. "One of the most impressive features in recent discoveries regarding the relations of food to health and vitality," writes Dr. H. C. SHERMAN, "is that the benefit of better feeding usually becomes fully apparent only when it is continued throughout a large part of the life-cycle, and often the benefit is greater to the second generation than to the first. . . . Through simply a wiser emphasis in the daily choice and use of ordinary staple foods, there may result improvements in the vitality of the individual or the family, all within the bounds of normal nutrition, but of very real significance for the maintenance of health or for recovery from disease. . . . As there has been so strong a tendency to attribute longevity entirely to hereditary factors, it may be worth while to emphasize the fact that . . . the influence of food on longevity is demonstrated with such degree of mathematical certainty as is represented by 'chances' much better than 10,000: 1, or with a hundredfold greater certainty than is usually considered necessary for the conclusive establishment of such scientific observations."

JOHN R. FREEMAN is one of America's great engineers. In fact, in a recent selection of the ten greatest American engineers he was, of course, included in the list. A survey of his prodigious accomplishments easily explains why. Early in the year a testimonial dinner was given Dr. Freeman by fellow American engineers and by citizens of Providence. Many of the latter, knowing him to be President of the Factory Mutual Fire Insurance Companies, were astonished to learn that he was even more eminent and active as a civil engineer. As a matter of fact, Dr. Freeman considers his great achievement of welding together the Factory Mutual system as minor to his work in hydraulics, seismology, and civil engineering in general. In his earlier days, he made many fundamental contributions to hydraulic engineering, and during his long career as a consulting engineer, he has advised on the locks and dams of the Panama Canal, the Grand Canal in China, and the Keokuk Dam on the Mississippi. He has served the Canadian Government as consulting engineer on water power conservation, and the present renaissance in hydraulic study and research in this country is almost wholly the result of his efforts. It was due to his influ-

(Continued on page 108)

# The Bath Tub Murder



By Mrs. L. R. Dooley, Tulsa Junior League. One of a series of TIME advertisements prepared by Junior Leaguers.

In 1793 revolutionary terrorists controlled France. The Girondins (idealistic moderates) had been defeated. Three men ruled Paris: Danton with his Cordeliers, Robespierre with his Jacobins, and one who was too suspicious, too sincere for party attachment, Jean Paul Marat.

Marat, at this time near death from a painful skin disease contracted in two years of hiding from political enemies in the sewers of Paris, was confined to his home. There, burning with his malady, his political spleen, his consuming energy, he spent his days in a treated bath, compiling his daily pamphlets. He was so engaged on the late afternoon of Saturday, July 13, 1793.

As TIME, had it been published in 1793, would have reported subsequent events:

... Long a sufferer from pruritis (malignant eczema), Jean Paul Marat, 50, Swiss M.D., potent revolutionary pamphleteer, erstwhile pill-mixer in England, ingenious experimenter in physics, correspondent of the late great Ben Franklin, was accustomed to write his daily "Journal de la Republique Francaise," receive visitors, in the bathroom of his Paris apartment. There, soaking in the medicated waters of a shoe-shaped bath, a sheet to pull about his shoulders, a writing-board across his knees, he found surcease from his affliction, prepared with some composure lists for the guillotine. Above him, on the wall, were a map of France and two pistols; above the pistols the written words: "La Mort."

Cultivated Americans, impatient with cheap sensationalism and windy bias, turn increasingly to publications edited in the historical spirit. These publications, fair-dealing, vigorously impartial, devote themselves to the public weal in the sense that they report what they see, serve no masters, fear no groups.

To this apartment, with its strangely-used *salle de bain*, came last week a fresh-faced country miss. Pleasantly she gave her name: Marie Anne Charlotte Corday D'Armont; her business, news from Caen, where Marat's exiled foes, the Girondins, had fled. (TIME, June 10). She was unwillingly admitted, escorted to the bath by Marat's housekeeper and common-law wife, one Simonne Evrard. Left alone, they talked: the neatly-gloved caller, handsome in ash blond hair, white bonnet; the naked, repellently-ill patriot.

Shortly Simonne Evrard heard a feeble cry: "A moi, ma bonne amie, a moi!" Bursting in, she found Pamphleteer Marat stabbed, dying, the bathwater fouled with blood. Vainly she tried to stop the flow with her hands, screamed shrilly for help which quickly came.

Aloof, poised, Assassiness Corday did not resist arrest.

Questioned, Mlle. Corday, 24, convent-trained, descendant of Dramatist Corneille, admitted the killing, insisted she was no common murderess; surrendered from beneath her fichu her baptismal certificate pinned carefully to an heroic manifesto flaying Marat's terrorism; also a sheath for the fatal ebony-handled dinner knife, purchased the day before for two francs.

On trial July 17th, asked by dread Prosecutor Antoine Fouquier-Tinville if she had practiced the death-blow (the knife penetrated neatly between 1st and 2nd ribs, pierced lung and aorta) Mlle. Corday replied, indignant: "The wretch! He takes me for an assassin!"

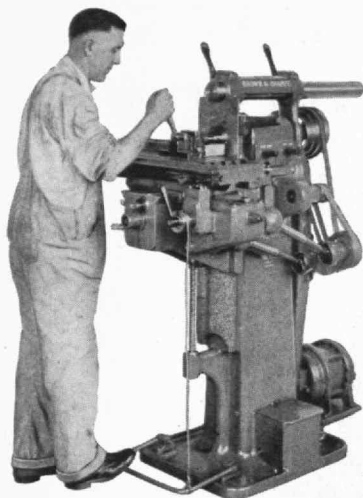
Condemned, she refused a priest, spent her last hours posing for Portraitist Hauer, his payment a lock of her shorn hair. Then, in red chemise, she began the jolting journey through rain to the guillotine....

# TIME

The Weekly Newsmagazine

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## THE TABULAR VIEW

(Concluded from page 106)

ence, for instance, that Congress voted the appropriation for constructing an international hydraulic laboratory at the Bureau of Standards. He has sent many young men to Germany to study in the great German hydraulic laboratories, and he has served in an advisory capacity in the establishment of the Institute's hydraulic laboratory. Carrying his interest still further, he has financed the publication of a notable book, "Hydraulic Laboratory Practice," and is now sponsoring the publication by the Institute of a series of translations of German hydraulic titles. Besides his degree from M.I.T. in 1876, Mr. Freeman holds honorary doctor's degrees from Brown (1904), Tufts (1905), *Sachs Technische Hochschule* (1926), the University of Pennsylvania (1927), and Yale (1931). He has been a member of the Corporation of the Institute since 1893. In 1929 he received an honorary fellowship from the Polytechnic Institute of Karlsruhe, bestowed "in recognition of his pioneer activities as a many-sided engineer in prominent scientific research and his service for the international promotion of hydraulic systems." He was designated in 1927 by the Federal Government as its representative to the Third International Congress of Scientific Management in Rome, and in 1928 he was a member of the Committee of Eighty sent to the World Engineering Congress from America. He has been President of the B.S.C.E. (1893), of the A.S.C.E. (1922-23), of the A.S.M.E. (1904), and he is a fellow of the American Academy of Arts and Sciences.

**M**R. ROSSMAN'S article on page 117 "Do Engineers Invent?" is presented by The Review without comment, but with the expectation that our readers themselves will furnish adequate comment. Mr. Joseph Rossman is a new contributor to The Review. He is a chemical engineer and a member of the United States Supreme Court Bar. For the last eight years, he has been Patent Examiner in the U. S. Patent Office and Editor of the *Journal of the Patent Office Society*, the only periodical in the country which deals with patent law and related subjects. Mr. Rossman is a graduate of the University of Pennsylvania in Chemical Engineering, receiving his LL.B. and M.A. from George Washington University, and his Ph.D. from American University. He has written much, having contributed over 60 articles to technical journals. His book "The Psychology of the Inventor" is allied in feeling and thought to the subject of his article in The Review, and the research necessary in preparing this book gave him an authoritative background on which to base his conclusions on engineering inventiveness. He obtained first-hand information from a group of over 700 inventors, from such well-known men as Elihu Thomson, Reginald Fessenden, John Hayes Hammond, Jr., and August Smedh. This material was supplemented by questionnaires sent to patent attorneys in the United States and to research departments of the large corporations.

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Rosser

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# THE TECHNOLOGY REVIEW

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THE COVER . . . . . *From a Photograph BY HIROMU KIRA*  
*The Mulholland Dam in Hollywood, Calif.*

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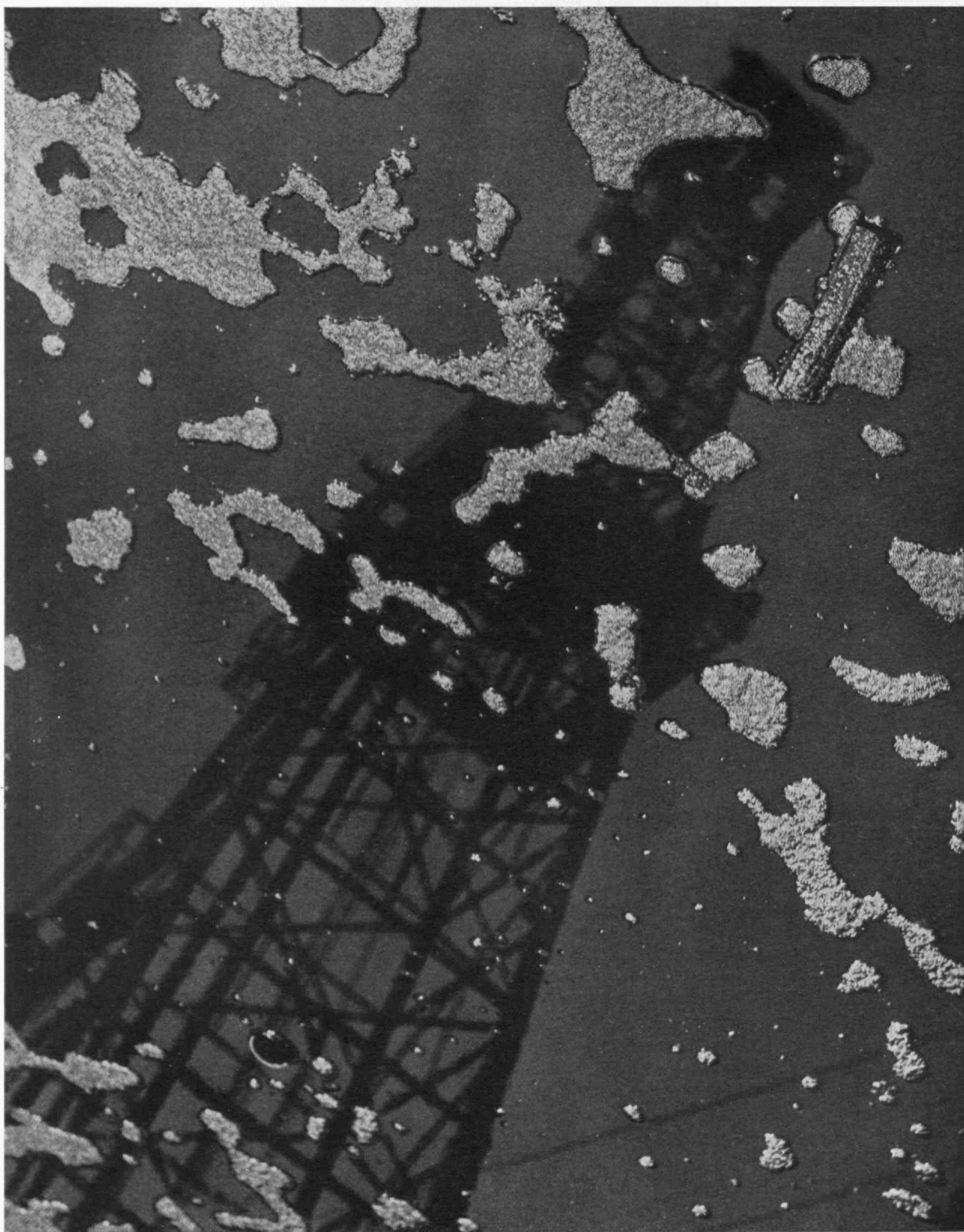
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*M. I. T. Photo*

*Reflection of an oil derrick on the surface of an oil pool flecked with foam. The 10,000-foot oil well pictured in the October Review has been exceeded by an oil well in Vera Cruz, Mexico, which has been carried to a depth of 10,585 feet, nearly two miles. During the drilling of the well, as high as 300,000 barrels of hot salt water per day gushed from the hole, as well as obnoxious gas at great pressures*

# THE TECHNOLOGY REVIEW

Vol. 34, No. 3



December, 1931

## WHAT TO EAT

### *Recent Advances in Our Knowledge of Foods*

BY MORRIS FISHBEIN

PREVIOUS to the development of our modern knowledge of foods in their relationship to health and growth, the principal concern of mankind relative to food was quantitative rather than qualitative. The question was how to get enough to eat, rather than how to get the specific constituents of food substances to provide the human being with the qualities that foods are now known to yield. The experience of mankind in eating, which obviously began with mankind himself, was sufficient to indicate the hazards of some foods from the point of view of their toxicity, or poisonous character, to indicate the digestibility of other substances, and to demonstrate the unnecessary stress placed upon organs of elimination by still other products.

Hence there developed the knowledge that starvation may be desirable in overcoming certain disturbances, and later it was learned that the treatment of some diseases, as of the kidney, might involve the elimination of substances that place an undue stress upon various organs. The books dealing with diet used by the medical profession were concerned largely with specific diets for certain diseases rather than the relationship of food diet to health and growth.

The American dietary of a previous generation is now criticized as being too low in vitamins and bulk, too high in sugars and concentrated foods, and with a tendency to acidity rather than alkalinity. Today, enough has been learned to suggest a healthful diet.

It has been found that in good health the average man of moderate activity requires food which will give him in energy value 2,500 to 3,000 calories. Women,

because of their lesser size and activity, require approximately 2,500 calories. The food substances used contain, from the point of view of nutritional chemistry, proteins, carbohydrates, fats, mineral salts, and vitamins. The diet must contain in protein approximately 80 to 100 grams per day. There are, of course, various theories as to what constitute adequate proteins. Thus, the vegetarians insist that meat proteins are not only unnecessary but absolutely undesirable. There is, however, no definite data to indicate that degenerative diseases affecting the kidneys and the blood vessels occur any less frequently among vegetarians than among the population generally who are omnivorous and who take fairly large quantities of meat proteins. The English, who are particularly noted as heavy meat eaters, are notoriously a hardy race.

Vegetable proteins are believed by competent authorities to be less efficient in maintaining the tissues of the body than are meat proteins. Few people realize that there are many types of protein. Complete proteins contain all of the amino acids essential for growth and for tissue repair; others are partially complete, because they do not contain these substances. The best examples of complete protein are milk, lean meat, and eggs.

As man grows older, he requires less protein than when young. Not that his tissues need less repair, but because they have lost the power of repair inherent in younger cells. The vegetarian probably is able to get along as he does on his vegetable diet because he is willing to make the mental concession that milk, eggs, and fish are not meat.

*Food faddists attack not only the dietary customs based on hundreds of years of experience, but even the results of well-conducted, scientific research. The average American prefers white bread. The food faddists insist that he ought to take whole wheat bread because it is nature's own method of production. They do not take into account the fact that children are intolerant of foods rich in cellulose and that for many of them brown bread is very irritating. Appetite is such an important factor in all digestive considerations that nobody who dislikes any food of unproved value should be forced to eat it if it can be avoided. The British Medical Research Council points out that in time of peace the grown-up population will never eat whole wheat bread unless they like it, but that they may force their children to eat it in the belief that they are doing them good because exaggerated and false advertising has conveyed that impression. There is nothing in whole wheat bread in the way of protein, carbohydrate, fat, mineral salts, or vitamins, that cannot be provided through various other food substitutes.*

In a recent survey of the subject, Dr. Willard J. Stone evaluated the evidence for and against proteins in the diet of the person with kidney disease. There was, of course, a large body of empirical opinion indicating that excessive consumption of protein may be responsible for degenerative changes in the kidneys and in the blood vessels. The evidence on both sides of the question was inconclusive. Excess protein was apparently harmful in some conditions in both animal and human experiments, but the evidence was not certain that the degenerative changes were the result of the protein exclusively. The conduct of a brief experiment cannot be made to resemble sufficiently the dietary habits of a human body through 70 years of life. Dr. Stone feels that proteins should be restricted in types of kidney disease in which faulty utilization of protein is evident, but that in case of hardening of the arteries, with or without blood pressure, and with associated disturbances of the kidney, there appears to be no valid reason why the proteins should be restricted beyond the point necessary to maintain the normal amount of nitrogen in the blood.

There are other dietary faddists who inveigh against all proteins, claiming that they putrefy in the bowel and that this putrefaction is responsible for all sorts of disease. The food faddists who contribute these ideas usually betray complete ignorance of chemistry, of physiology, and of biology, as do those, equally ignorant, who give them credence.

The research on proteins has concerned their essential chemical nature, their physiologic chemistry, and their course from ingestion to digestion, assimilation, and excretion. The research has included thousands of articles representing the researches of chemists all over the world. Nevertheless, the field remains little touched.

**T**WO hundred years ago, chemists and scientists recognized various types of sweet substances. Today, carbohydrate chemistry is almost as complicated as the

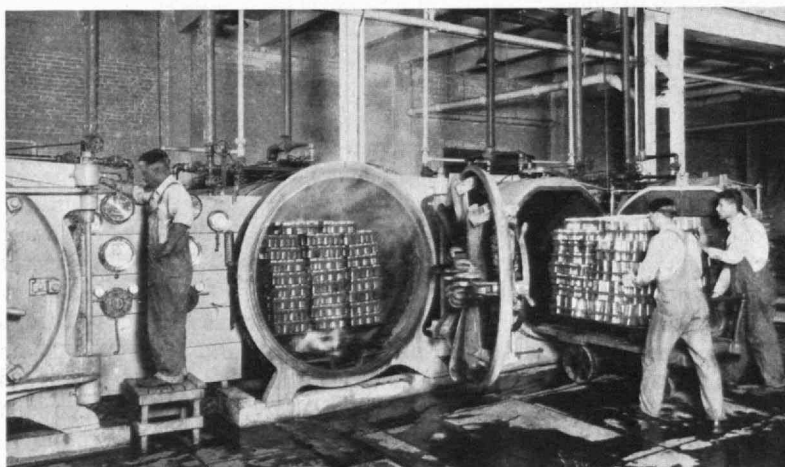
chemistry of the proteins, and its biological aspects are the subject of numerous debates. Chemists classify carbohydrates as single sugars, double sugars, and complex sugars. In the body, carbohydrates are a source of energy for work. The amount used depends on the amount of work. During prolonged starvation, the carbohydrates stored in the body, particularly in the form of glycogen in the liver and in the muscles, are used to supply the body's needs. Excesses of sugar taken into the body are stored and finally, when the storage facilities are exhausted, reconstituted to form fat.

The consumption of sugar in the United States in 1821 was seven pounds annually per capita. Today, it approximates 99 pounds a year per capita. This has resulted from cheaper production and changes in food habits. Associated with this increase in the use of sugar, there has been an increase of obesity, of diabetes, of gastric and duodenal ulcer, but such an association may not have a cause and effect relationship. There has also been an increase in the number of automobiles.

Many scientists insist, nevertheless, that there is some definite relationship between the consumption of sugar and the increase of the amount of ulcer of the stomach. No doubt, an equally serious criticism of the increased consumption of sugar is based on its displacement of other foods of vital importance; namely, the inorganic salts and the vitamins. Sugars give a sense of satiety. They appeal to the sense of taste, thereby producing a tendency to eat habitually rather than as needed. The human being can take into the body only a certain total amount of food. If the entire capacity is used up by sugar, obviously other equally, if not more, important substances may be omitted.

The utilization of sugars in the body is closely related to the function of the pancreas, the liver, and the muscles. The discovery of insulin focused new attention on sugar metabolism. In diabetes there is a deficiency in the way in which the body uses up sugar. It has been argued that there is also some relationship between sugar utilization and high blood pressure.

In one series of experiments it was shown that all patients with high blood pressure had high blood sugar curves, notwithstanding the fact that there was no diminution in the amount of insulin available in the



Steel retorts in which sealed cans of asparagus are cooked. Three thousand tins are handled at each cooking

Del Monte Company



body. It has been argued indeed that there was some relationship between the adrenal glands and the effects of insulin. These two substances act in opposition to each other, insulin decreasing the amount of glycogen stored in the liver, and epinephrine, the active substance of the adrenal gland, increasing it.

Modern chemistry of the blood has made the estimate of sugar in the blood a comparatively easy matter. It is now recognized that there may be conditions in which an excess of sugar circulates and also conditions in which a deficiency may exist. An overdose of insulin may produce a sudden deficiency with associated weakness, mental confusion, muscular trembling, and even convulsions. It is believed that this deficiency of circulating sugar may result not only from an overproduction of insulin or an overdose, but also through loss of substances that are antagonistic to insulin.

Specialists in diseases of the skin associate diets high in carbohydrates with cases of eczema and other skin disorders. The British Medical Research Council has published an extensive study of carbohydrates of various plant and other foods.

**N**OTWITHSTANDING all of the scientific material that has been developed in various places on the subject of food, faddists attack not only the dietary customs based on hundreds of years of experience, but even the results of well-conducted scientific research. The average American prefers white bread. The food faddists insist that he ought to take whole wheat bread because it is nature's own method of production. They do not take into account the fact that children are intolerant of foods rich in cellulose and that for many of them brown bread is very irritating. Appetite is such an important factor in all digestive considerations that nobody who dislikes any food of unproved value should be forced to eat it if it can be avoided. The British Medical Research Council points out that in time of peace the grown-up population will never eat whole wheat bread unless they like it, but that they may force their children to eat it in the belief that they are doing them good because exaggerated and false advertising has conveyed that impression. There is nothing in whole wheat bread in the way of protein, carbohydrate, fat,

*In the midst of this evolution of knowledge regarding foods, the consumers, and particularly the medical profession, have been confronted with the fact that charlatans of one type or another have taken advantage of the newer knowledge to spread propaganda for food products beyond the actual values that they contain, and indeed to give the public a false impression of what can be accomplished by foods. Into this mass of mingled truth and deception has entered the Committee on Foods of the American Medical Association. This Committee was created by the Board of Trustees of the American Medical Association to do in the field of foods what the Council on Pharmacy and Chemistry of the Association has done in the field of drugs and medicinal preparations. Up to September, 1931, the Committee had studied 541 products, of which 165 were accepted. Manufacturers who have submitted their products to the Committee have, in the majority of instances, been prompt to change labels and to correct advertising claims in order to make their products acceptable. The work of this Committee means great good for the American people.*

mineral salts, or vitamins, that cannot be provided through various other food substitutes.

It must be remembered that the cereals, as well as the sugars, are classified as carbohydrate foods. They provide a high caloric intake, but must be supplemented by milk and by other foods to serve the needs of the human being. Cereals constitute the main source of the diets of most of the people in the world. In countries like India and generally where the diet is little diversified, real nutritional and economic advantages can be secured by consuming whole cereals rather than highly milled grain products.

Fats are necessary for growth and development not only because they provide energy, but also because certain vitamins are found in fats. The tendency of Americans to overweight causes them not infrequently to avoid fats of all kinds. The tendency of overweight to be associated with the early occurrence of degenerative diseases and with gall bladder diseases has caused physicians to urge the avoidance of fats to those past middle age, with the particular avoidance of meat fats, butter, cream, gravies, and rich pastries. At the same time, however, it may be advisable for such people to

take small doses of cod liver oil, or any of the concentrates which are rich in vitamins A and D, since it is unlikely that these fat soluble vitamins will be available in diets that are too greatly restricted in fat content. These points are, of course, elementary, but they are based on considerable amounts of scientific research which is sufficiently technical to appeal to those who are technically minded.

**T**HE turning of attention to the mineral content of foods is also a fairly recent phenomenon. The primary salts of interest are iron, copper, calcium, phosphorus, magnesium, sodium, potassium, and iodine. Manganese, zinc, and aluminum have also received attention. Foods have been analyzed as to their content of minerals. Copper,



*Del Monte Company*

*Feeding iron to pineapple plants. The machine spreads a solution of lime sulphate*



Thompson

*Coconut rafts on the Pasig River, Philippine Islands. They are floated down to factories where they are manufactured into the coconut milk and coconut honey described in the November Review*

zinc, manganese, iron, aluminum, and nickel are commonly found in plant- and sea-food. These metals and tin are generally present in the human body, but their exact functions are not definitely understood.

When metallic salts are taken in with food, they combine with the proteins. There are certain charlatans who have attacked aluminum on the ground that eating from aluminum cooking utensils causes cancer. There is not the slightest evidence for this belief. Aluminum occurs naturally in many plant substances and in foods and has not produced poisoning so far as anyone knows. Excessive doses of any mineral salt will cause disturbances of digestion.

The daily food of an adult should contain at least one-fourth of a grain of iron. There are an immense number of foods that contain this amount in an ordinary dietary, the list including lima beans, peas, whole wheat, lean beef steak, spinach, oatmeal, raisins, eggs, green vegetables, and particularly liver and kidney. There has been much argument that organic iron is better than inorganic iron for the purpose of building blood. The evidence in favor of inorganic iron seems to be just about as good as for organic iron, but both of them require apparently certain agents, such as are found in liver, for their best utilization.

Some of the investigators at the University of Wisconsin have shown that a deficiency of copper interferes with the assimilation of iron. Practically all of the copper that a human being needs is found in wheat germ, almonds, oats, kidney beans, rye, peas, asparagus, and barley.

The great mineral deficiency occurring in the average diet is that of calcium, an element necessary for building bone, for normal action of the heart, and for coagulation of the blood. The amount needed in the daily diet of a normal person is to be found in a quart of

milk. Excess amounts are needed during pregnancy and lactation. Calcium is best obtained from milk, cheese, carrots, cabbage, and turnips.

With the exception of iodine, most of the other mineral salts that are needed are found in ordinary well-balanced diets. It seems quite certain that various areas of the country have soils that are deficient in iodine, and associated therewith an increased amount of goiter. The normal thyroid gland stores about 25 milligrams of iodine. Arrangements have been made for promoting the use of vegetables from sections of the country where the soil is rich in iodine, but the deficiency is also easily made up by the use of iodized salt and more certainly by the giving of regular doses of various preparations of iodine.

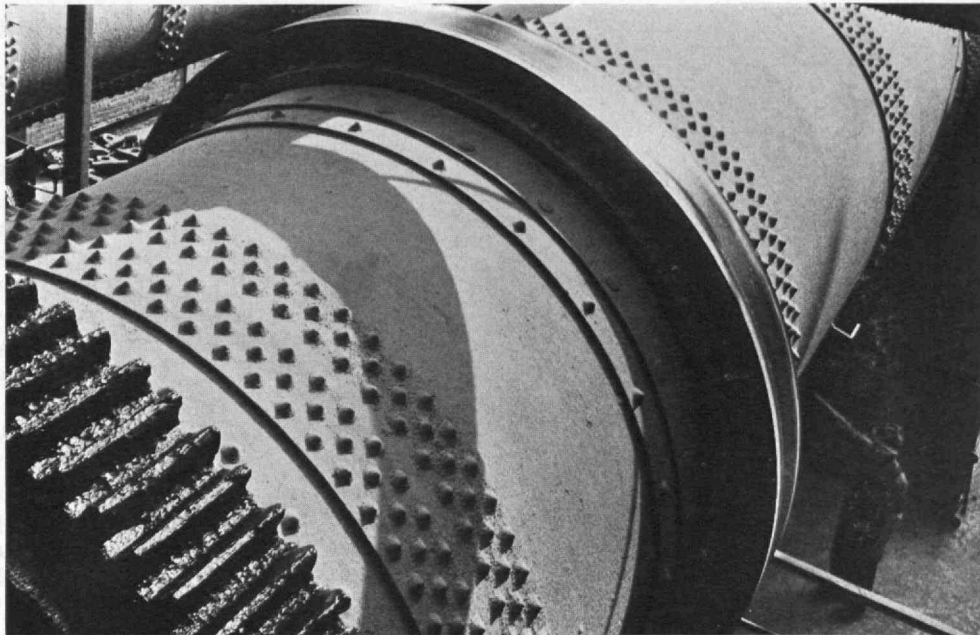
**N**O attempt has been made here to list the tremendous number of researches that have been necessary to evolve the facts here set forth. Studies made by thousands of chemists in institutions all over the world, by nutrition experts, by physicians, by physiologists, and by many other types of investigators have been necessary to contribute these facts. It required not only a study of conditions as they exist in white rats, but also as they occur in babies, in children, and in adults, since conditions of growth, digestion, and nutrition vary in each group.

Indeed, it has required whole books merely to trace the development of our knowledge of the prevention of rickets and of dental caries by the use of vitamin D associated with calcium and with phosphorus. Studies continue to be made on the relationship of vitamin D to A, and the exact mechanism by which vitamin A helps the human being to resist infection is a matter of constant investigation. It was taken for granted, for instance, that the mere fact that fresh fruits or vegetables contained a vitamin permitted the conclusion that this could also be found in the dried fruit, the juice of the fruit, and in similar preparations. Special studies were necessary to prove that the vitamins may be affected by all sorts of environmental conditions, and means have been developed for providing optimum conditions in canning, packing, or otherwise preserving such materials.

What was once known as the vitamin theory is now accepted as well-established, scientific fact. The definite relationship of vitamin deficiency to disease is perfectly established. Practically all natural food substances contain vitamins of one type or another, and the average American diet, consisting of fairly good quantities of a large variety of food substances, takes care of most of the vitamin needs of the body. There is no reason why people should take excessive quantities of cod liver oil or cod liver oil tablets.

Vitamin deficiency in any single case can only be discovered by a careful study of the diet and health of the individual. A haphazard taking of great quantities of vitamin-containing foods, with the hope of improving the health generally, may injure the very health that one is trying to conserve.

The vitamins now fully established include vitamin A, fat soluble vitamin, necessary in liberal proportions not only during growth but (Continued on page 140)



Margaret Bourke-White

## DO ENGINEERS INVENT?

### *And Why Do They Abhor the Label "Inventor"?*

BY JOSEPH ROSSMAN

THE existence of our entire technological structure is due to the efforts of a comparatively small number of men, consisting chiefly of highly trained engineers and inventors. Surprising as it may seem, the engineers, as a group, have not been very creative in the sense of producing entirely new devices or structures. They have been chiefly concerned with duplicating past results and keeping the wheels of industry in motion. Inventors, on the other hand, create something new; they organize known devices into new combinations which have not existed before.

Before discussing this lack of inventiveness among engineers, however, it is only fair to note that our general population, consisting of over 100 millions, shows a very low productivity. Using patent statistics as one criterion, we find that less than 50,000 patents are granted each year by the U. S. Patent Office. But even this figure cannot be attributed to the entire population. We must first subtract the number of women who comprise about half of our population, as they account for only 500 patents each year, and practically all negroes, as they rarely invent. We must finally pare down our total population to white males between the ages of 20 and 50, for comparatively few inventions are made by men outside of these age limits.

Rear-Admiral Fiske, himself an inventor, has said: "It is true that many of the most important inventions have been made by engineers; but this has been because some engineers, like Ericsson, have been inventors also. But it is also true that only a small proportion of the engineers have made original inventions; and it is

equally true that many inventions have failed — or have been slow in achieving success — because of the lack of engineering skill in construction or design. These facts show that the work of the inventor is very different from that of the engineer, and that the inventor and the engineer are very different people, though an engineer and an inventor sometimes live together inside of the same skin. In fact, it is by a combination of inventive genius and engineering talent in one man that the greatest results in invention have been achieved; though great results have often followed the intimate coöperation of an inventor and an engineer, the two being separate men."\*

In order to determine definitely what proportion of engineers invent, the 18,373 biographies in "Who's Who in Engineering" (1925) have been read, noting those which mention any inventions. In compiling this volume the publishers stated: "We had the coöperation of the Engineering Societies here in New York, officials of big organizations; such as the Edison Company, American Telephone and Telegraph Company, and Western Electric Company. An official connected with these organizations gave us a list of their important engineers. We have made every endeavor to keep this strictly on a professional basis. Questionnaires sent out contained blank spaces for the average information to give engineers' records and achievements and in this the records on file in the engineers' societies here in New York were of great value."

\* B. A. Fiske, *Invention, the Master-Key to Progress*; New York: Dutton, p. 10 (1921).





Thurman Rotan

*Above is the globe of the earth in the lobby of the Daily News Building, New York, and on the opposite page are light fixtures in that same building*

The publishers further stated that each engineer was asked to list his invention, if any, but they could not definitely state whether instructions had been exactly followed in each instance. No distinction was made between patented and unpatented inventions.

The actual count of the biographies indicated that of the 18,373 engineers, only 1,835, or 10%, had made inventions. In comparison with the inventiveness of the entire population, however, this percentage is very high. We must also bear in mind that many engineers solve problems with a high degree of ingenuity and could obtain patents for their developments if they applied for them. Furthermore, most engineers abhor the label of inventor, and they are usually satisfied in merely overcoming a problem as part of their routine work without ever thinking that it involves such a thing as invention. Consequently, they do not consider most of their achievements as inventions.

Perhaps engineers themselves are not to be blamed for their low percentage of inventiveness. The work of many of them is largely routine in character, leaving little time for original work. Most men in the engineering profession are necessarily conservative and they are obliged to adhere to tradition in their work, for they are paid to do so. Furthermore, the training of engineers, as given in most schools and colleges today, is hardly conducive to an original attitude of mind. There are few engineering schools in this country which encourage

original or creative work on the part of their students. No courses are given which tend to stimulate or bring out any latent originality. Rather is most of the time spent in studying text-books and authorities so that by the time the student graduates any originality he might have had has been completely stifled and suppressed.

Mr. Samuel W. Rushmore, an engineer-inventor (well-known to the automotive industry as a former manufacturer of headlights and of an electric starting and lighting system, and also noted for the steam-cooling system for automotive engines which he developed in spite of the discouragement of automotive engineers) aptly states the situation as it appears to him: "I believe, from a very wide acquaintance with graduate engineers, that the engineers as a class rarely invent anything and are opposed to all new inventions simply from sheer laziness and cowardice and a general attitude toward life that stifles all imagination. I further believe that the colleges are largely to blame in their insistence upon rigid, soul-killing worship of precedent and their cramming of immature minds with such a mass of simple data that imaginative power and all initiative are destroyed."

Of the opposition and difficulties encountered by Mr. Rushmore in introducing his steam-cooling system for automotive engineers, Herbert L. Towle wrote: "Every inventor has to combat prejudice. The first locomotives were denounced as dangerous to public safety. The *Clermont* was 'Fulton's Folly' until it ran. Lightning rods were an impious interference with divine providence. The steam injector brought forth letters from famous engineers to editors, showing why it could not work. Rudolph Diesel died before his engines gained any wide acceptance.

"In his younger day, my friend [S. W. Rushmore] invented a special winding for dynamos, producing results at the time deemed impossible. He invited a distinguished electrical engineer to walk three blocks to see it at work.

"I wouldn't go across the street to see the laws of Nature violated," was the reply. And other experts said much the same. Yet that winding later became standard for a certain type of dynamo. After several such experiences, it is not strange that my friend has small faith in engineers!

"Yet not all innovations receive such hostile treatment. High-speed steel is a classic example of the seemingly impossible being convincingly demonstrated and winning prompt acceptance. The water-tube boiler had, so far as I know, no discouraging early struggle. . . .

"There is a reason for both the failures and the successes. The engineer, by natural bent and training, has a strong sense of facts. He thinks clearly where the average person thinks vaguely. He looks for a principle while the layman is fumbling with details. He welcomes a new device, the need for which he recognizes.

"But the engineer's mind has the defects of its qualities. Only the elect add the priceless gift of imagination to their grasp of facts. The rank and file are not creators:

they are copyists, 'inventing' and 'improving' by inches only. They are perpetually mistaking habits for laws. Because a fuel or metal has acted in a certain way under certain conditions, they think it must act thus under any condition. And the engineer of commonplace mind, who has merely been stuffed with books, is even harder to convince than the rule-of-thumb mechanic. If he doesn't worship precedent like a lawyer, he comes pretty near it!

"It follows that one who would sell a new thing to engineers must understand minds as well as things. He must sense what phase of his proposition will win their interest without antagonizing them. Engineers are human, with their full share of professional pride. They have no great respect for inventors as a class, for they know the worthlessness of most of the grist that flows through the Patent Office, it being estimated that only about 10% of all patents issued prove to be valuable; and they know that even a good invention usually needs an engineer to make it work. The inventor who undertakes to tell an engineer that he (the engineer) is a poor fatwit who is to be pitied for not having conceived the device himself, may expect anything but a cordial reception."

Another engineer has said in this connection: "The instant the engineer begins to invent things he loses caste with his profession because his work is new and cannot, therefore, be based upon past experience and it is, therefore, not good engineering practice. It creates doubt, protest, and ridicule, to all of which the inventor must be deaf.

"The majority of men do not give birth to new thoughts; they do not think, they only remember and gather from books, travel, and personal contact what they have read and heard and seen. They collect their thoughts as bric-a-brac gathered from a thousand sources. True, they may sometimes arrange their ideas, borrowed from the past, in new and attractive classifications, but they live in the past and feast upon the husks of thoughts discarded by others. They mix wines of a thousand vintages in old and new bottles, but they plant no vineyards. Their minds toil not in gestation, their hands spin flax already prepared by others, yet Solomon in all his glory was never so brilliant as they in their borrowed wisdom. Not so the inventor, he approaches

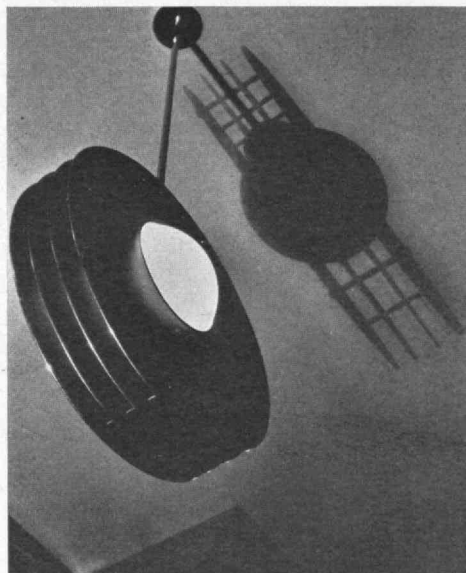


Thurman Rotan

his problem from behind; he looks always toward the future into a *terra incognita*, he sails an uncharted sea as Columbus did. He begins at the end of the world, where knowledge and experience ends; beyond him there is no beaten path, no light, no compass, no chart . . . nothing."\*

Mr. C. Roy Watson continues this idea in a personal letter: "The engineer has to know detailed precedent and to apply it conventionally and thoroughly. The inventor has to know general principles only and to be extravagantly imaginative and idealistic. The engineer moves by rote in a comparatively fixed path. The inventor adventures or juggles with the engineer's paths. The engineer is a reproducer of old combinations and the inventor is a producer of new combinations. The inventor is often self-educated. They are complementary and supplementary to each other; in fact, mechanical results of a high order require some conformity to the genius of the salesman, manufacturer, and other fields of human tendencies. If the engineer dealt only with general or broad elements, his work would lack detail and if the inventor went too much into details, he would become muddled by indirection or the incapacity to digest and organize his elements. There are different tendencies in engineering. The practically experienced engineer will cover his field in a broad way while specialists or technical engineers, who might have greater volumes of detail knowledge, can only contribute to one angle of the work. Many varieties of special traits or mental tendencies are required in engineering work as well as contributions from many angles of engineering experience. Hundreds of trades enter the details of modern complex devices.

"When a great Teacher said 'a little child shall lead them,' He realized the inhibitive state of mind that experience and education carry with it. Clear and rational thinking is most apt to be found in the unfettered mind." Too frequently the engineering mind is fettered.

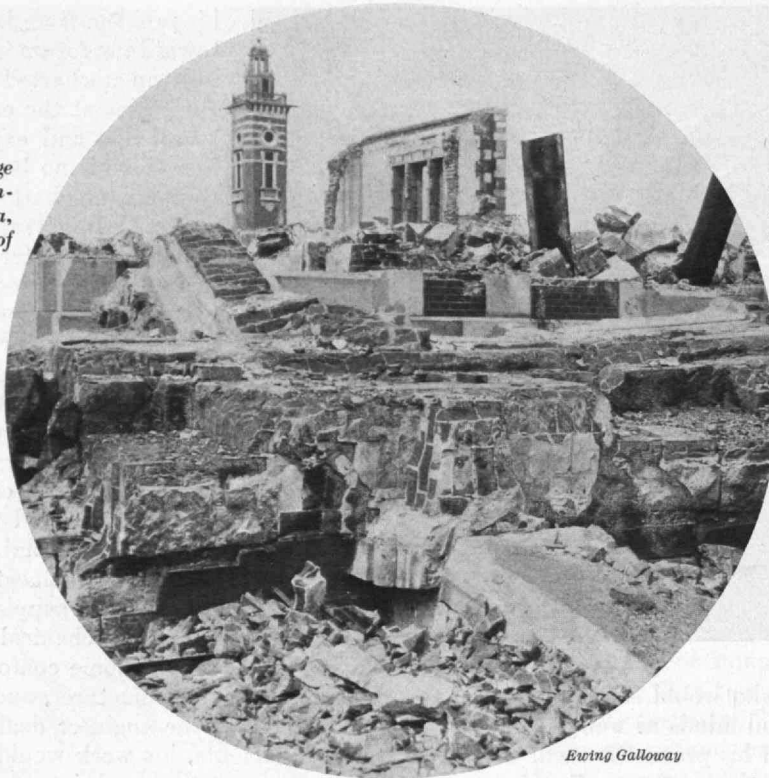


Thurman Rotan

THE resourcefulness, ingenuity, and daring of American engineers as shown by their achievements probably have no precedent in all of human history. Our engineers are great builders and, under favorable conditions, they can unquestionably invent. In order to verify this theory of inventiveness, a thousand questionnaires (Continued on page 144)

\* W. L. Dempsey, Letter to Editor, *The Automotive Industries*, Vol. 53, pp. 340-341 (1925).

*Earthquake damage  
in the Foreign Con-  
cession, Yokohama,  
1923. Thousands of  
people were killed*



*Eighty per cent of the  
city's buildings were  
destroyed and a mile  
of breakwater sank*

*Ewing Galloway*

## EARTHQUAKE ENGINEERING

### *Engineers Need Data for Designing Structures to Resist Earthquakes*

By JOHN R. FREEMAN

IT IS amazing that the American structural engineer possesses no reliable data to aid him in the design and construction of buildings to withstand earthquakes. Although there are approximately 50 seismograph stations in this country, and a still larger number of seismologists, both professional and amateur, their studies of earthquakes have contributed little to the sum of engineering knowledge on the form, amplitude, or acceleration of the motion of the earth during a great earthquake.

Engineers have not often been called into the councils of seismologists, nor have the latter seemed to understand the engineers' needs or to realize their great opportunity for contributing accurate knowledge for the design and construction of earthquake-resisting structures. The reason for this is that the attention of seismologists has nearly always been applied in other fields than in trying to measure the motions that have existed, or the forces that have been applied, during an earthquake, within those areas where damage has been caused. Rarely, if ever, has there happened to be a seismograph capable of recording a violent earthquake located anywhere within the relatively small zone of great disturbances. The sites sought for seismographs are on ledges or on the most rigid ground available, whereas it is obvious that the greatest damage to struc-

tures has always occurred on relatively soft, unstable ground, such as the "made land" along the water fronts of great cities or land reclaimed by filling swamps and tidal marshes.

Very little attention has been given heretofore to the design of seismographs capable of recording strong earth motions. Nearly all existing instruments are extremely delicate and sensitive and built to magnify motions of less than one 1/100 or one 1/1,000 part of an inch from far-distant earthquakes otherwise imperceptible to the senses. When these instruments are subjected to the strong motion of a nearby earthquake, they are instantaneously deranged and made incapable of any record whatever.

To design structures capable of resisting earthquake motions, engineers must first of all have some accurate measure of the force and the kind and amount of the motions which are to be resisted. The force imposed on a structure by such earthquakes as have occurred in Charleston, San Francisco, Santa Barbara, Tokyo, and in Italy are not irresistible, nor is it beyond the resources of physics and engineering to measure the force and the amount of the motion with reasonable accuracy.

There is a current notion fostered by some seismologists and incorporated in tentative building laws of several California cities that the engineer should design



his structures to resist an acceleration of one-tenth of the acceleration produced by the force of gravity on a freely falling body. In other words, he should design to resist a horizontal earthquake force that will produce an acceleration of 3.2 feet per second per second, which in effect is to say that he should design the buildings to be capable of withstanding in all its parts a horizontal force equal to one-tenth the total structural weight above the particular plane under consideration. Traced back to the sources, this rule is found to be a matter of opinion, not of measurement; a product, not of the seismometer, but of the "guessometer."

**I**N JAPAN, a year or more prior to the great earthquake of September 1, 1923, Professor Tachu Naito worked out methods for computing stress in various members of the framework of certain large buildings up to 100 feet in height, which is the limit under Japanese building laws. He started with the assumption that the acceleration of the forces to be resisted were equivalent to one-tenth the acceleration of gravity. Buildings designed to meet this rule survived without damage in the midst of a zone where others all about were wrecked. The extra cost for this scientific earthquake-proofing for Japanese conditions added only about 15% to their cost. It is particularly interesting that the degree of acceleration or earthquake force in the particular district where these buildings stood was probably twice or three times that which Professor Naito had assumed as the basis for his designs. This excess prompts investigation of modifying circumstances.

Let us for a moment consider the nature of earthquake motion and the means by which it can be measured. Commonly, wreckage is wrought within a period of only about one-half minute in duration, immediately following the arrival of the first strong shock. This wreckage appears to be accomplished by irregular oscillations having a frequency of from one to one and one-half seconds, and a double amplitude of horizontal motion seldom exceeding one or two inches, although sometimes larger.

In the great Tokyo earthquake of 1923, for example, the amplitude during the period of major destruction, as measured at the Imperial University, was 3.5 inches. Following the main shock a few hours later there was an aftershock with a recorded amplitude of nearly eight inches, but this had so much less rapidity of oscillation, that a consequently smaller degree of wreckage was produced by it than by the short, snappy motion with which the strong earthquake began. It is obvious and certain that the earthquake performs its wreckage by means of the resistance of a structure, expressed by its inertia, to the motion of the ground upon which the structure rests.

The theory of measuring the earthquake force which a building is called upon to resist is simple. Under well-

known laws of physics, any force can be measured by the acceleration, or rate of increase in velocity measured in feet per second per second, which this force is capable of producing in a body free to move. The force of gravity is measured by the acceleration due to gravity; *i.e.*, by the acceleration which this force of gravity produces in a freely falling body. Gravity serves as a convenient and universal standard of force with which the force exerted upon a structure by an earthquake may be compared. Therefore, the prescription given to the engineer is to design for an earthquake acceleration having some definite percentage of the acceleration produced by gravity.

It is generally accepted that earthquake wreckage is mainly produced by horizontal motion, and the problem of the engineer is to give his structure sufficient strength against horizontal force so that it may resist both wind-storm and earthquake.

**M**UCH remains to be found out about the characteristics of motion within the area in which wreckage occurs. No serious attempt has yet been made in the United States to discover the form of orbit of a material particle at or near the center of an earthquake, or the tendency to increase stress in a structure by repetition of pulsations of the same period. Little is known of the relation of motion of the earth near the surface to that at the bottom of a deep foundation; the relation of motion of a building to that of the earth on which it rests, if soft and wet; or the relief of stress by rocking motion. Information about every one of these factors is important to the structural engineer, whom commerce and capital are calling upon to design and build structures greater than were dreamed of a decade ago.

To safeguard human life, the engineer must have more knowledge of earthquake motion before he can intelligently meet the demands made upon him. And what are the seismologists doing to help him? Up to the



*Ewing Galloway*

*to Y&P 60000 Ruins in Tokyo after the disastrous earthquake in 1923*



Ewing Galloway

*Houses sliced by the great earthquake at Messina, Italy, in 1908*

present their attention has been devoted chiefly to geophysics, and to the study of the elastic waves sent out thousands of miles from the earthquake center. They have discovered much about the constitution of the globe. Their investigations indicate that at the center of the earth there is a ball several thousand miles in diameter, of a density corresponding to iron alloyed with nickel. They believe that at a distance from 40 to 50 miles beneath the surface of the earth there is a very hot and plastic layer within which isostatic readjustments are continuously being made. Indications are that earthquakes commonly have their origin at from ten to 30 miles beneath the surface. The accepted theory is that they are caused by the elastic recoil following a sudden relief of stress, which occurs either by a sudden transverse rupture of the deep strata or by the sliding of the edge of one stratum against the face of another along the deep face of an ancient fracture or geologic fault. While this knowledge is of great scientific interest, it means little to the engineer in search of data to enable him to design a structure that will successfully resist the forces of a great earthquake.

One of the first steps toward obtaining the information he requires is the development of a cheap and simple form of strong-motion seismograph which will record throughout violent earth disturbances. In brief, the engineer requires "close-up" instead of distant studies on the motion of the earthquake.

Artificial earthquakes also offer opportunities for many researches on characteristics of earth motion and on the increase of horizontal motion under the surface of the ground as compared with that at the bottom of a deep foundation. These minor earthquakes are made frequently in the course of great quarry blasts, and in the "shooting" of oil wells. Investigation in this field could be made at relatively small cost.

Impact tests by a dull, heavy thud against the foundation block of large and very tall buildings are not beyond the range of practicability and might reveal

much about the behavior of a building while under vibration stresses without damage or serious risk to the building. In such an undertaking the building should be equipped with various types of instruments, including accelerometers and seismographs, at the bottom, mid-height, and at the top.

Engineers will also be greatly assisted in their studies and designs for earthquake-resisting structures by geological maps of various cities and other localities, which will show zones of maximum probable earthquake oscillation. Such a map has recently been prepared of the City of Boston by a local geologist, giving depth to bedrock, areas of "made land," and so on.

**F**URTHER experiments should be carried on with shaking-table apparatus, one of which has recently been installed at Stanford University. While research upon earthquake phenomena by means of shaking tables is still in its infancy, no line of attack on the dynamics and kinetics involved in so designing a structure that it shall be earthquake resistant presents greater promise of valuable results. Heretofore, study of the dynamic effect of earthquake motion upon buildings has been given little consideration; and in order to simplify calculations of design, the common assumption has been made that earthquake effect on buildings could be estimated as if produced by static forces.

Such analysis fails to include the element of time during which the force of the earthquake acts in any one direction; also the fact that the stresses and strains imposed may have insufficient time to be transferred throughout the structure before a reversal of motion occurs. Such a condition, obviously, cannot be accurately represented by means of the application of static forces. Experiments by means of the shaking-table apparatus can be looked upon to give much valuable information about the dynamic effect of earthquake motion upon various types of structural design.

Few textbooks in the English language make any reference to the design of structures to resist earthquake forces. Accurate data about the form, amount, and acceleration of earthquake motion in the area of greatest vibration during an earthquake, and comprehensive experiments by means of shaking-tables on models which follow rigorously the laws of dynamic similitude, will be a tremendous aid in the economical design of earthquake-resisting structures, and will form a strong incentive for authors to include this subject in future textbooks on structural design.

In Japan, much attention is being given to measurements of earth-tilt, which has been indicated as a forerunner of earthquakes. These investigations include many lines of precise levels which are run across large fault-blocks, and the development of an extremely delicate instrument, known as the Ishimoto clinometer, capable of measuring changes of less than one-tenth of a second of arc, equivalent to 1/32 inch, in a distance of one mile.

Since the great earthquake of September, 1923, Japan has advanced steadily in economic seismology, particularly in those matters which are helpful to the engineer in safeguarding human life and property with maximum economy of building material. (*Concluded on page 148*)



# THE TREND OF AFFAIRS

IN THIS SECTION: *How to Make an Airline Pay* (127); *Shipping Gasoline Through Pipes* (124); *A Corner Stone Edition of The Review* (126); *The Proper Way to Ventilate a Building* (126); *Shipping Wheat by Hudson Bay* (128); *The Secret of Irradiated Oils* (129); *Streamlining for Efficiency* (130); *The Van de Graaff High Voltage Generator* (123); *Mechanical Properties of Rubber* (147).

## 15,000,000 Volts; A New Master Key of Science

CONSTRUCTION of a generating apparatus designed to produce direct current at the amazing potential of 15,000,000 volts is to be undertaken at M. I. T. within the next few months, and upon completion of the device, Science will have in its possession a new master key for countless unopened doors of Nature. This new method of producing hitherto unattainable high voltage currents was perfected by Dr. Robert J. Van de Graaff in experimental apparatus built at Princeton University, where, with a small model, he has reached already a potential of 1,500,000 volts. That in itself is a major achievement, but it is a mere beginning. In his method there is promise of electrical energy of 50,000,000 volts with currents of the order of milliamperes.

The principle of this high voltage generator is that of the well-known Kelvin water-dropper. Where Kelvin carried out his experiments by a succession of water drops, Dr. Van de Graaff employs an endless belt, which may be either insulating or may contain a series of conductors separated by insulators. By this device, supplemented by suitable electrostatic shielding, he has shown that a very inexpensive set operating in air can produce considerable currents at voltages up to 1,500,000.

To attain the very highest voltages he mounts this apparatus in a vacuum which is made so perfect by modern evacuating means as to eliminate electrical discharges. Under these conditions, the voltage which can be attained is limited either by mechanical strength or electrical breakdown of insulating supports, or by the pulling of electrons out of the metal parts purely by the strong fields. The limit set by all three of these factors may be made very high by suitable design.

Dr. Van de Graaff has built a small model operating in a vacuum under a bell jar, which

gives satisfactory results. He is now constructing a much larger one, operating in a metal vacuum tank about six feet long, and is at present perfecting details to prevent the limitation of voltage by the third factor mentioned above.

Dr. Van de Graaff's present experimental generator is a comparatively simple device consisting of two brass spheres two feet in diameter. These globes of metal are supported and insulated from the ground by glass rods. In each sphere of the device a belt of silk, operated by a motor at the base of the supporting rod and running over a pulley within the metal globe, conveys the electric charge to the sphere. Here it is stored much as the human body stores electricity generated by the rubbing of shoes on a carpet. Instead of being produced by friction, however, the charge is "sprayed" on the silk belt by a method known to scientists as a "corona" or "brush"

discharge. Although this voltage sprayed on the belt is comparatively low, the sphere becomes charged with higher and higher voltages as it picks up the stores of electricity brought to it by the belt.

In Dr. Van de Graaff's present 1,500,000-volt generator, each sphere is charged with 750,000 volts. As an electric pressure of 1,500,000 volts is reached, sparks three feet long fly from the great brass spherical terminals.

The importance of this new generator, which produces steady direct current, is indicated by the fact that the highest steady potentials hitherto available for researches have been less than 600,000 volts. In only a few laboratories in the world is steady current of more than 300,000 volts obtainable. In every case the apparatus to produce this current is extremely expensive, elaborate, and heavy, while Dr. Van de Graaff's device costs but a few hundred dollars. The experimental model generating 1,500,000 volts was built for \$90. In the apparatus which Dr. Van de Graaff will build in the airship



Dr. Van de Graaff and his 1,500,000-volt generator





*Dr. Van de Graaff manipulates his generator for Dr. Karl T. Compton, President of M. I. T.*

*Wide World*

dock at Round Hill, the huge metal terminal spheres will be 15 feet in diameter. Each will be mounted on towers 20 feet high and constructed to permit variation of the distance between the spheres. The operator of the apparatus will sit within one of the spheres. His body, as well as the sphere, will be charged up to several million volts, but since he will be entirely surrounded by metal this tremendous charge will have no effect upon him.

If the huge generator is successfully built at Round Hill, it will contribute enormously to the study and resolution of fundamental scientific problems. Its rich promise and versatile character may be indicated if a few of these problems and possibilities are adumbrated:

1. Production and study of x-rays of many million volts, including studies of their therapeutic value.

2. Use of x-radiation thus produced to extend our knowledge of the relation between wave-length of radiation and absorption of matter to the region of much shorter wave-lengths. This will make possible, for example, a much more accurate estimate of the wave-length of cosmic rays than is now possible, and will, therefore, have a predominating influence on the astrophysical theories of the fate of the universe, *i.e.*, the theories of Jeans, Eddington, Russell, Einstein, and others.

3. At these high voltages it will be possible to project electrons and positive ions with velocities comparable with those projected by radium, but in quantities millions of millions of times greater than can be obtained from any radioactive source. This should make possible studies of atomic disintegration, transmutation, and

investigations of the nature of the atomic nucleus, subjects which have only been scratched on the surface by the means which have thus far been at our disposal.

4. With modern high vacuum technique, and with a source of voltage of the magnitude here predicated, calculations indicate that it should be possible to construct a motor, operating on electrostatic forces, which should be tremendously efficient. For example, the power developed per unit weight may run to several thousand times that which can be attained in the present type of electromagnetic motor, and the efficiencies (neglecting frictional losses) are calculated to be upwards of 99.999%. The construction, furthermore, is exceedingly simple in comparison with the present type of motor, except for the necessity of operating in a high vacuum.

All scientists today realize the importance of developing a high voltage source. Dr. Tuve of the Carnegie Institution of Washington was recently awarded the thousand dollar prize of the American Association for the Advancement of Science for the development of a source of voltage of two or three million volts. Dr. Millikan, of the California Institute of Technology, has been working with his associates for some years to develop a million-volt, x-ray tube. Professor Lawrence, of the University of California, has recently received a grant to enable him to develop a high voltage source of electrons, in which the electrons are speeded up by successive applications of a moderate voltage, properly synchronized.

All of this work is valuable and promising, but is subject to restrictions from which Dr. Van de Graaff's method is free. For example, the work of Tuve and of Millikan is dependent upon high-voltage transformers which involve tremendously expensive equipment and for which the ultimate limit now in sight appears to be not over 5,000,000 volts, if that high. The method of Lawrence is limited to very minute currents and is applicable only to the speeding up of electrons, and not to the speeding up of positive ions. Dr. Van de Graaff's apparatus produces positive or negative voltages at will and gives a continuous, direct current of appreciable magnitude.

The first public demonstration of this very important new source of electrical energy was given at the recent inaugural dinner of the newly established American Institute of Physics. Dr. Van de Graaff is now a research associate in the Department of Physics at M. I. T. He is already at work designing the large generator which is to be housed in an airship dock on the estate of Colonel Edward H. R. Green at Round Hill, Mass., where, through the generosity of Colonel Green, the Institute has been carrying on research in electrical engineering and physics for several years. A beginning on this new generator was made possible by a gift to M. I. T. of \$10,000 from the Research Corporation.

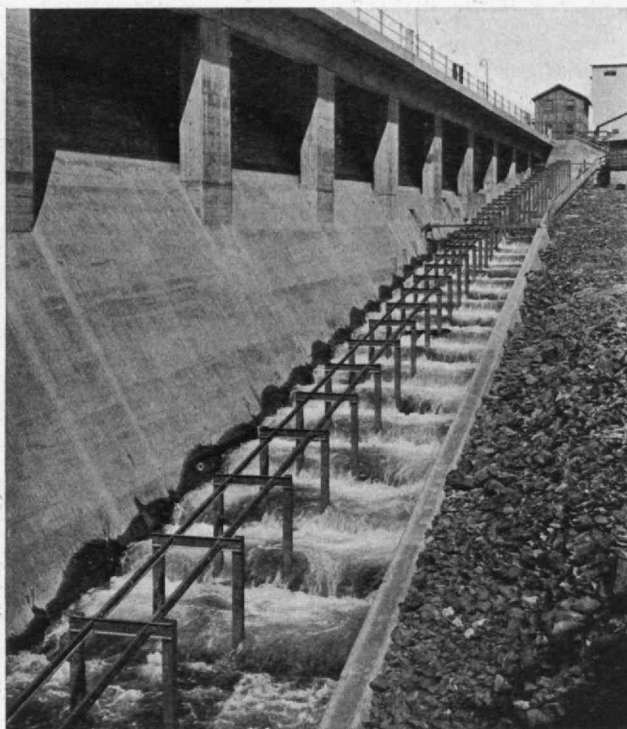
### *Gasoline Pipe Lines*

OUR much harassed railroad system, the Job of our economic order, is now faced with a new plague. For a number of years crude oil and natural gas have been distributed about the country by means of pipe

lines, and now a new and startling development is that of long-distance, *gasoline* pipe lines. Already there are in excess of 3,500 miles of pipe lines in the country used for the transportation of gasoline from its place of origin to distribution points.

These lines transport gasoline for practically one-half the cost of railroad transportation, and at the same time they yield a profit to the pipe line companies. The published tariffs of these companies are practically the same as the tariffs for gasoline on the railroads, which means that a company owning a pipe line can either undersell its competitor or else make a substantial profit by transporting the competitor's gasoline. The statement has been made that one-half the profits of the Humble Oil and Refining Company during 1930 were derived from its pipe-line operations.

At the present time, the most important gasoline pipe lines are confined to three groups: 1. California, for transportation from fields to shipping terminals; 2. Mississippi Valley region, for transporting gasoline from Texas and Oklahoma to points north; 3. the lines transporting gasoline from the Atlantic seaboard to western Pennsylvania and the Great Lakes region. Gasoline pipe-line operation, however, is not confined to these three districts by any means. Wherever there is petroleum production or refining, such lines are being projected and put into operation. For example, the Standard Oil Company of New York has announced the construction of a six-inch pipe line, 98 miles long, for conveying gasoline from Providence, R. I., to Springfield and Worcester, Mass. Experts in the petroleum



*Stone and Webster Journal*

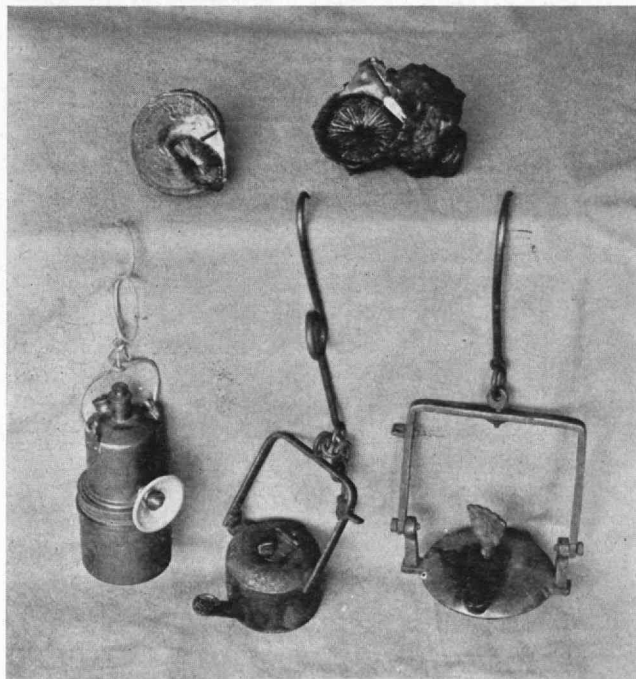
*Fish ladder at Rock Island Dam on the Columbia River. Two of these ladders are provided to enable fish to pass freely from the river below the dam to the lake above*

industry prophesy still further expansion and express the belief that within a few years the entire country will be networked with gasoline lines.

A survey made by the Barnsdall Oil Company, when it was making plans for the construction of its pipe line, showed that the number of automobiles registered in a strip of country 100 miles wide along the proposed route of the gasoline line consumed five times as much gasoline per year as the line could transport.

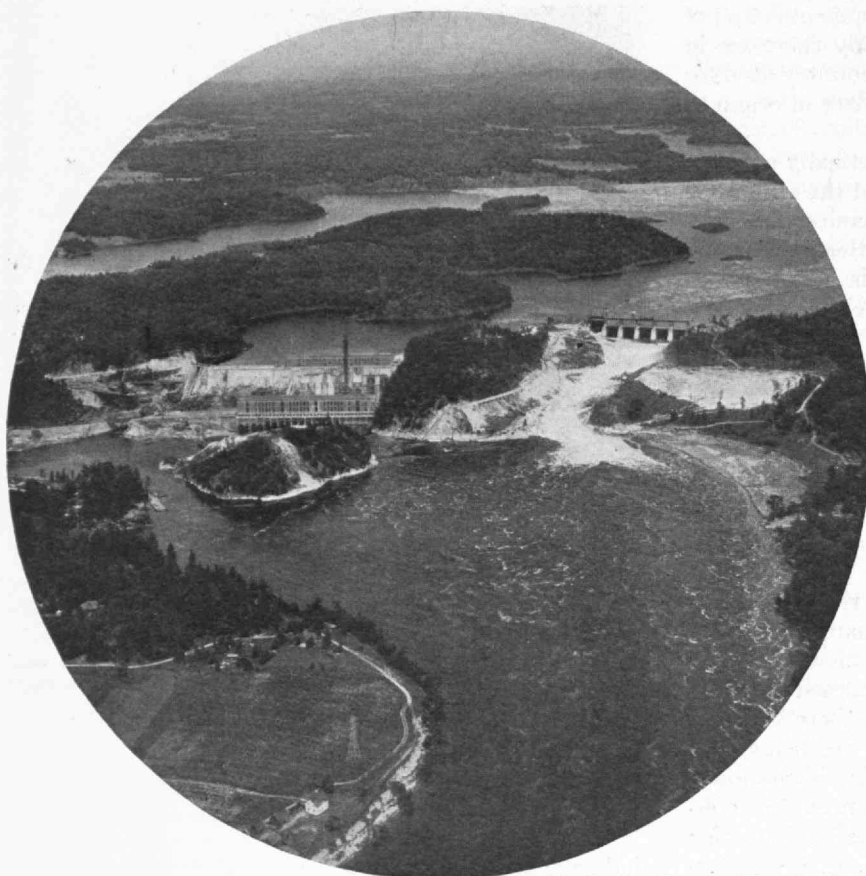
These gasoline trunk lines run continuously. They are thoroughly reliable and the technical problems originally encountered have been satisfactorily solved. It has even been found perfectly feasible to pump one grade of gasoline through the pipe line and follow it immediately by another grade, or an entirely different liquid or gas. The Phillips Company, for instance, pumps one grade of gasoline through its lines for a period of time. This quantity they call a slug. As soon as the required amount of this grade has been pumped into the line, it will be immediately followed by a second slug of some other class of material. Liquefied, commercial butane, having a Baumé gravity of approximately 114, may be followed by a slug of 59 gravity gasoline and the resultant mixing will be remarkably small. A test of the amount of mixing in one instance showed that the mixed portion in the lines amounted to only 9,000 gallons, or a trifle over 200 barrels. In pumping gasoline from Texas to St. Louis, the pipe line carriers usually estimate a mixing of about 450 barrels, or the gasoline in one mile of line.

When a glance is given at the present enormous capacity of crude oil and natural gas pipe lines and at the prospect for gasoline pipe lines, it becomes apparent that a new primary, national transportation agency has



*The evolution of the miner's lamp as shown by a photograph sent by Masaki Ito, '18, mining engineer at the Sumitomo Besshi Mine, Iyo, Japan. The photograph shows the development of the miner's lamp of the open wick type from the very early shell form to the acetylene lamp of today. It is understood that during the hundreds of years that the Besshi Copper Mine has been in operation, these various types of lamps have been employed. Mr. Ito has presented to the Mining Department of M. I. T. a splendid specimen of shell lamp and an early metal lamp*





Canadian National Resources, Information Service  
*Pagan Falls Power Development on the Gatineau River in Canada*

been created and another serious competitor of the rail carriers is in existence. Immense pipe-line programs have been actively carried out during the current economic depression. Between 450 million dollars and 500 million dollars were spent on pipe lines in 1930, and more than 533 million has probably been expended during the current year.

### *Corner Stone Science*

**L**AYING in a corner stone used to be a fairly simple ceremony requiring little preparation. A speaker or two would deliver an elegant apostrophe to this or that and someone would throw in a few documents and smear a little mortar, the while the building constructor bewailed the interruption. But no more. There has sprung up a well-defined science devoted to the preservation of corner-stone records which has changed the entire complexion of this one-time plain and simple gesture.

We should point out before going any further that our interest in this subject arises from the growing use of this happy fireside journal as a corner-stone document. Its recent inclusion in the corner-stone of the new Eastman Research Laboratory here at M. I. T. placed squarely before us the fact that we have been missing an opportunity in not making special copies of *The Review*, guaranteed against deterioration, available at any time and place to corner-stone archivists.

The necessity of doing this was well illustrated recently down in Washington when Poli's theater was wrecked. Its corner stone was known to contain

important records deposited therein 47 years ago for the benefit of posterity. But, alas, posterity was cheated; the documents were found to be indecipherable.

It is to prevent this unfortunate result that the science of the preservation of corner-stone records has been created. Among its achievements is the preservation process devised in Japan for keeping the record of the 1923 earthquake victims. The names were inscribed with special ink on a special paper manufactured by the Japanese Government. The records were then wrapped with oiled silk, next with asbestos, and placed in air-tight, fused quartz containers, in which the air had been replaced with argon gas. To make doubly sure, the containers were also covered with asbestos and finally with carborundum. These precautions against chemical deteriorating agents, fire, and physical stresses are destined to preserve the records for at least 10,000 years.

Other methods, less laborious than this, are gaining favor. In the corner stone of the Eastman Research Laboratory, certain records were placed in a glass tube filled with carbon dioxide. In Washington, the corner-stone records of the District of Columbia's war memorial, upon the recommendation of the Bureau of Standards, were type-written on special cotton-fiber paper made by the Bureau paper mill. They were then sealed in an air-tight, copper box from which the air had been removed and replaced with nitrogen gas, which is relatively inert. Next, the niche containing the box was waterproofed.

Somehow, however, we lean to the Japanese method. It is more elegant. In fact we have decided to adopt it as the official form in which the corner-stone edition of *The Review* is to be embalmed. Copies so treated will be supplied to the corner-stone industry at cost, plus 100%. Thus do we increase our circulation in times of economic stress.

### *Health Comes in the Window*

**T**HE old-fashioned method of ventilating a room by the simple expedient of opening its windows has been found by the New York Commission on Ventilation to fulfill the human requirements for which many expensive and complicated ventilating systems have been designed. While it does not condemn all mechanical methods, the Commission, after several years of study, has reached the conclusion that some systems not only fail to accomplish the benefits of the open window, but may actually be a menace to health.

The Commission's report was recently made public after a thorough investigation of the best methods of ventilating schoolrooms and auditoriums. In this study,



attention is directed to the fact that many states still require costly ventilating systems that are neither necessary nor efficient. Twenty states still have statutes or regulations on ventilating systems based on wrong or antiquated theories, and the Commission estimates that a total of nearly \$2,500,000 is wasted annually on the installation of such devices.

Among the requirements of these 20 states is one which requires that each person in certain buildings be supplied with 30 cubic feet of air per second, a condition which can be obtained only by mechanical ventilation employing fans. This system, the Commission finds, is not only costly but may, in some circumstances, be a menace to health because it is likely to produce drafts and overheating. The window-gravity method of ventilation, in the absence of specific unfavorable conditions, is said to be more satisfactory than the fan system because a more uniform temperature, proper humidity, and air circulation can be maintained.

Overheating must be avoided if comfort, efficiency, and resistance against disease are to be maintained. The Commission recommends that persons be protected from sources of direct radiation to avoid overheating. Classrooms should be designed to provide 15 square feet of floor space and 200 cubic feet of air space for every pupil. The heating and ventilating system should provide means of air supply and exhaust, capable of avoiding unpleasant odors and preventing, without chilling drafts, an increase in room temperature above 68°. A temperature of 65° F. is recommended for corridors, gymnasiums, and shops. Swimming pools and adjacent dressing rooms should be kept at 75°, while a temperature of 68° is specified for all other occupied rooms.

In its studies of the effects of overheating, the Commission has found that high temperatures with subsequent chilling cause conditions favorable for microbic invasion, and that such temperatures have an important effect upon the performance of physical work. At a temperature of 75° F., 15% less work was performed than at 68°, the conditions providing 50% relative humidity and no air movement. At a temperature of 86°, with 80% relative humidity, the decrease in efficiency was 28% compared with the physical effort shown at 68°.

There are many unsolved problems of ventilation that offer a rich field for study. Indications are that temperature variations at different levels above the floor may have a considerable physiological effect, the commission reports, but so far there is insufficient data upon which to base a conclusion on the desirability of exposing head or feet to temperatures lower than those which affect the body. Heat loss by radiation is known to be of fundamental importance and English workers are already making interesting studies in radiant heating. Data is lacking upon which to form an opinion as to the relative physiological effects of heat loss or heat absorption by radiation as compared with the effect of convection.

Professor C.-E. A. Winslow, '98, Head of the School of Public Health at Yale University, and from 1899 to 1910 a member of the Institute's Faculty, is Chairman of the Commission.

### *Profitable Airline No. 2*

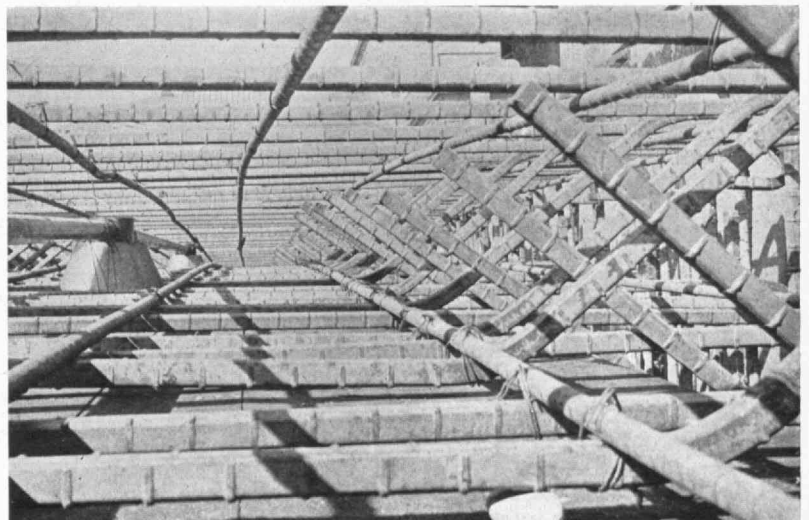
IN THE field of air transportation it has long been an axiom that the only airline in the world which is making a profit without benefit of subsidy is the German controlled S. C. A. D. T. A. (*Sociedad Colombo-Alemana de Transportes Aereos*). This Colombian airline was one of the earliest, having been established in 1921, and its environment was ideal. Its inland terminal, Bogotá, the nation's capital, is 600 miles from the coast and it is this route that the line traverses.

It covers the distance in eight hours, whereas normal, ground transportation by river-steamer, and railroad requires from eight to 12 days—certainly an ideal opportunity for air transportation.

Now, after ten years, S. C. A. D. T. A. loses its uniqueness in having achieved financial success without government assistance of any sort. The Ludington lines, operating between New York and Washington, with intermediate stops, and between Philadelphia and Atlantic City, is now on a paying basis, and the remarkable fact about its success is that it has an operating set-up that is far removed from the ideal Colombian situation. It has to compete with two first-class railroad services, a government subsidized airline, and at least three bus systems operating over first-class highways.

The majority of passenger airlines in the United States were organized, laid out, and equipped during the boom years of 1928 and 1929. At that time hangar buildings cost in the neighborhood of \$100,000 each; high-powered, tri-motored, 14-passenger planes, approximately \$50,000 each; and expensive shop equipment, executive offices, and salary rolls were almost invariably indulged in. Lines of this sort operate at an overall cost of from 65 cents to a dollar per ton-mile with passenger cargoes.

The Ludington line, backed by Charles Townsend Ludington, '24, and his brother, Nicholas, and directed by an exceptionally experienced and well-trained group



Concrete reinforcement for a tunnel ceiling

Harrington

of flying personnel, effected their organization a year ago last September. They leased one hangar in Washington and space in another at Newark. Their trimotored, ten-passenger airplanes cost them less than \$25,000 a ship. Their executive offices, shop equipment, and personnel organization are cut to a highly efficient minimum. Their overall operating costs, including conservative depreciation and overhead charges, have been reported in the annual statement at 37½ cents per ton-mile.

With their operating costs down, volume of traffic remained their one major problem. Departing completely from all previous practice, they instituted a service every hour on the hour during daylight as their departing schedules from the New York and Washington terminals. Fares were fixed to correspond with the usual railroad rate, plus pullman chair charges. Although the actual time saving was by no means tremendous, the public immediately responded. Approximately 5,000 passengers a month have been carried consistently since the opening of the line, the exact total for the first six months of this year being 29,169. Of material assistance has been a relationship with the Pennsylvania Railroad whereby the railroad ticket offices also serve as the booking offices for the airline, and the Pennsylvania Railway terminal in New York is the official point of departure by bus for the Newark airport. Gross revenue for the year amounted to \$576,885.86, all ex-

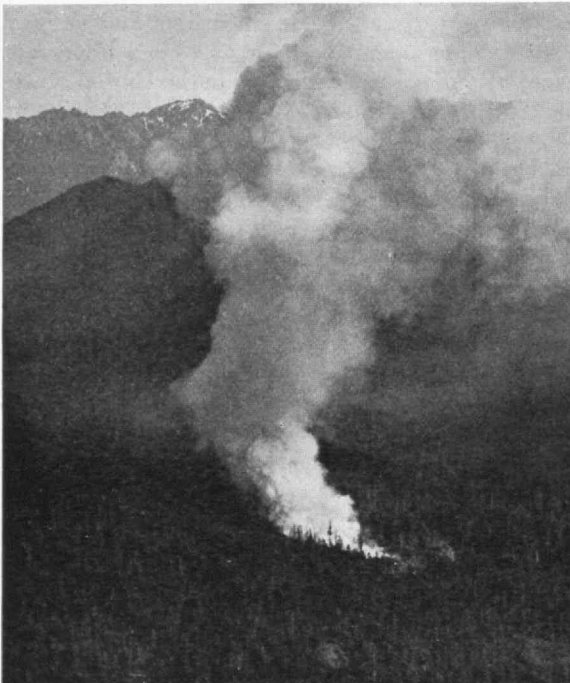
penses to \$568,812.25, leaving a profit, small, indeed, but one of tremendous significance in the troubled world of air transport.

Reverberations throughout the industry are, of course, very extensive. In the Middle West the Century airlines have already emulated the "every hour on the hour" service idea between Cleveland, Toledo, Chicago, and St. Louis. On the West Coast, the Century Pacific operates eight planes each way daily between Los Angeles and San Francisco and somewhat less extensive services to Sacramento and San Diego, a total of 36 daily schedules. A consequent rate war with the older airlines is under way in those districts and already fares are hovering in the region between 3.9 and 4.3 cents per passenger mile. Possibly even more important than its direct effect on competing passenger fares is its ultimate effect on the government policy of subsidy through mail contracts to the already existing lines. Twice since the passing of the Watres Act have the air mail rates to contractors been reduced. The friends of the airlines in Congress find it increasingly difficult to resist further economies by the Post Office Department.

### Hudson Bay Route

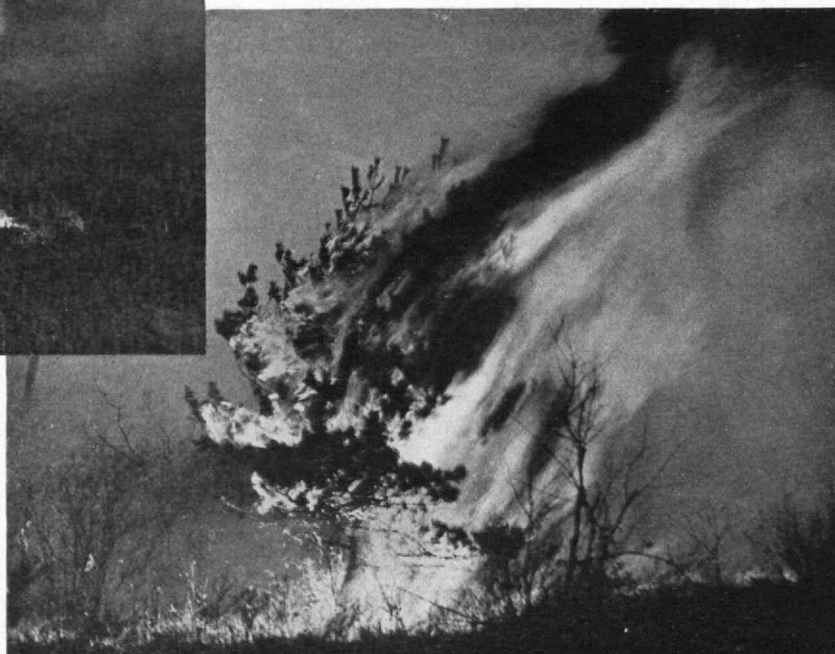
WESTERN Canadians may in time come to look back upon 1931 as something better than a year in which grain prices touched new lows. Agitated for a generation, the first test of sending wheat to England via Hudson Bay rather than overland to tidewater on the St. Lawrence and thence by ship, has now taken place. Two steamers, the *Warkworth* and the *Farnworth*, loaded at the Dominion's modern, newly installed elevators at Churchill on the Bay, passed successfully out through Hudson Strait and arrived without misadventure at their British destination.

In the saving of distance and the lowered carrying costs of a shortened rail haul to the embarkation point, the Hudson Bay route has every advantage. Churchill to



Brubaker

More than 500,000 acres of wooded area are annually destroyed by fire in the national forests of the United States and Alaska. In 1931, up to September 10, there were 7,385 fires reported, resulting in the destruction of 561,680 acres of wood land. Before fire protection was organized in 1910, the fire damage was nearly 5,000,000 acres per year



Blackington



Liverpool is somewhat less by sea than Montreal to Liverpool; Edmonton and Calgary are a thousand miles nearer Churchill than Montreal; Saskatoon to Liverpool via Churchill is a thousand miles less than by way of Fort William and the Great Lakes. Enthusiasts for the Hudson Bay route foresee wheat from Minnesota and the Dakotas as well as Canadian export wheat flowing through Churchill.

As yet, however, the length of the season during which shipments may be made is undetermined. Whether ice will permit navigation longer than three months a year is doubted by many authorities and some believe that in an occasional year it may be restricted to but a month's duration. This uncertainty tends, of course, to raise insurance rates and thus competition with the older eastern ports is made less easy. Then, too, the problem of return cargoes has a bearing, for Churchill as a one-way port is doomed. Scotch and Welsh coals brought in to undersell anthracite from the United States in the prairie markets have been suggested as a means of creating two-way traffic.

To Canada, as a nation, the project is a consideration of the first order though its successful conclusion can hardly be thought of as a blessing to her eastern provinces, or as a panacea for the many ailments of her vast railway systems. Assuredly the establishment of a flow of trade in this new direction might also be expected to have its effects on the United States. But to conclude off-hand that it would mean that "the transportation map of North America would have to be redrawn in the light of this new sea route" will be for a long while premature, to say the least.

Its accomplishment would, however, be most properly entitled to a place of prominence in world history for it would be, aside from the fur trade, the only noteworthy commercial yield derived from Henry Hudson's fourth voyage in quest of a short route to China when, in the summer of 1610, he sailed his 55-ton *Discovery* into the Bay which has since borne his name.

### Healing with Oils

**L**AST year German scientists found that irradiated oils had remarkable healing power in the treatment of suppurative conditions. The germicidal effect of these oils, which at first were applied in salve form, was increased when used in connection with aluminum or tin foil, the infection clearing up rapidly.

As a result of these experiments it was concluded that the healing powers of irradiated oils were due to emanations of light, and that the use of metal foils caused an indirect radiation which was the active substance. Further investigation by members of the Research Division of the Department of Biology and Public



Central portion of London, England. The Thames is seen in the upper left corner

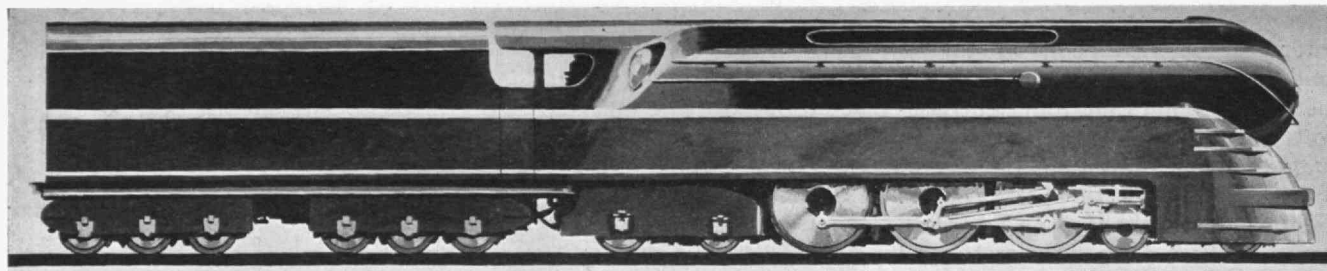
Aero Films, Ltd.

Health and the Research Laboratory of Organic Chemistry at Technology has shown, however, that the germicidal activity noted by the German workers is caused by vapors from the oils and not by radiation. The results of this important work were recently chronicled in a paper presented before the Division of Medicinal Chemistry of the American Chemical Society by Robert S. Harris, '28, Research Associate, Dr. John W. M. Bunker, Professor of Biochemistry and Physiology, and Dr. Nicholas A. Milas, Research Associate in the Department of Chemistry.

The investigations of these three workers show that the vapors of certain oils exhibit germicidal activity and that this activity is increased in some oils by irradiation. It was established that the germicidal substance is not a radiation but is gaseous. This germicidal activity presumably is due to volatile substances containing some form of peroxidic-oxygen, and the positive results from degassed oils shows that the peroxidic-oxygen is continually produced over a considerable period of time. In accounting for the increased germicidal activity of irradiated oils when used in contact with metal foils, it was suggested that this effect was due to the catalytic action of the metals by the production in the oils of substances containing peroxidic-oxygen.

Some 20 oils were used in this study, among them being high fatty fish oil, cottonseed, seal and tuna fish oils. Cod liver oil vapors were found to be germicidal after irradiation of the oil for 15 minutes. Irradiated cod liver and cottonseed oils, when degassed with a high vacuum, still gave evidence of germicidal activity, confirming the conclusion that the beneficial gases are formed continually.





*From a Design by Otto Kuhler*

*Suggestion for a streamline locomotive. The designer estimates that the head resistance of this type of engine (New York Central Hudson) is decreased by 28% at 70 miles per hour as a result of the streamlining*

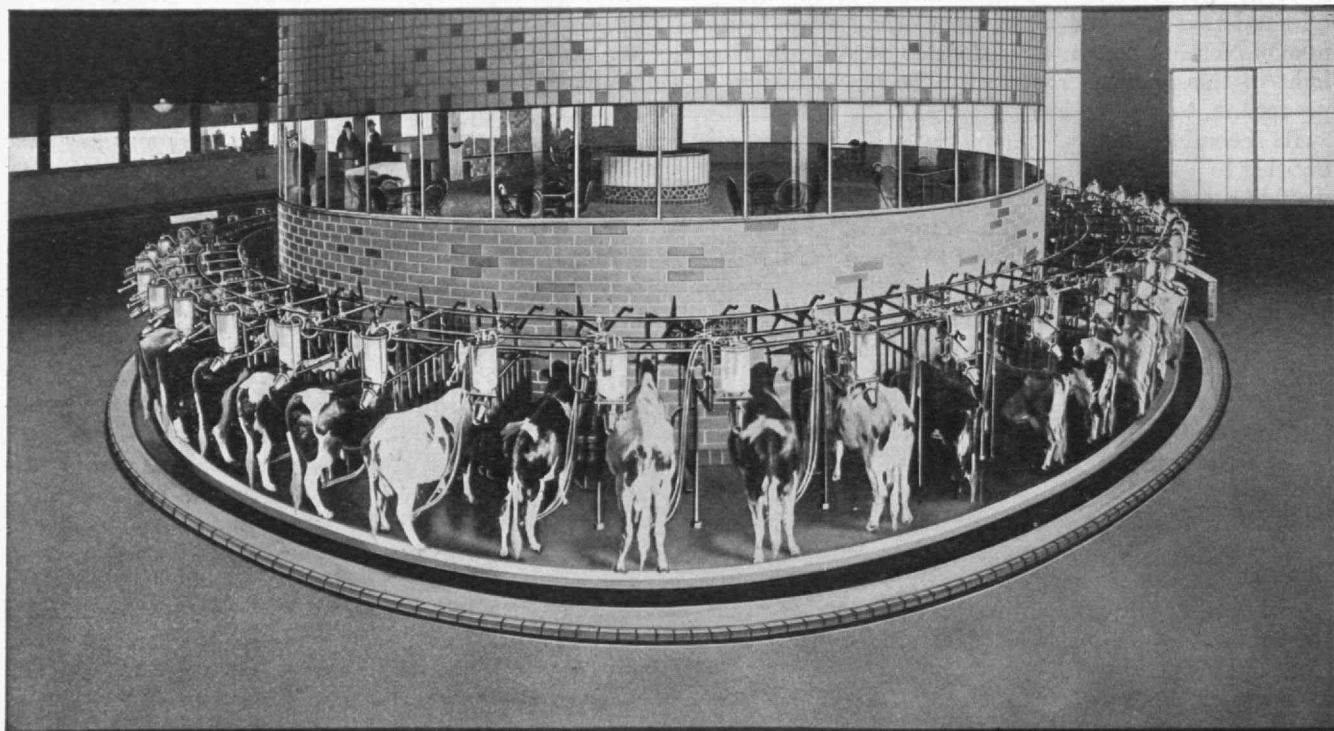
## The Curves of Speed

**A**UTOMOBILE designers are beginning to give serious consideration to the development of streamlined bodies, which, by reducing wind resistance, will make possible greater speed with less power. Aeronautical engineers have led the way in streamline studies and their investigations have brought about changes that after thorough trial leave no doubt of the benefits of streamlining.

Few automobile manufacturers, however, have had the courage to attempt to educate the public in the advantages of such a radical change in design as streamlining involves. The body of the present automobile still bears a resemblance to the horse-drawn vehicle of two decades ago. True, the whip socket is missing, but as a structure for swift transportation it is comparatively crude and inefficient. Automotive engineers estimate that by even elementary streamline design it would be possible to obtain from 35 to 40 miles to the gallon of gasoline, while further studies to produce a highly efficient streamlined body might result in an economy in operation of from 50 to nearly 100 miles to the gallon.

Recently there has been much discussion of the so-called "teardrop" car, a design which follows the shape of a falling drop of water as an efficient streamline form. Dr. H. L. Dryden of the United States Bureau of Standards, however, cautions against putting too much faith in the teardrop form. It is not necessarily the best streamline design, he believes. He explains that any form which is free of the angles or steep curvatures which cause wind eddies is streamlined to a certain degree.

Most of the engineers and designers agree that streamlining means not only a radical change in body form, but a complete rearrangement of the mechanical units of the car. The engine of the properly streamlined car will be placed at the rear of the body, seats will be much lower and the body itself is likely to be narrower than the present types. These changes, however, are expected to bring additional benefits in added safety at high speeds and greater ease in steering. The streamlined car of the future probably will have a bullet-like front with a long, sharply tapering rear end that will leave the air so little disturbed that practically no dust will be raised. With the engine behind the passengers the annoyance of heat and noise will be greatly lessened. (*Continued on page 146*)



*The Borden Company*

*A machine at the Walker-Gordon farm in Plainsboro, N. J., the Rotolactor, which automatically milks 50 cows in 12½ minutes*

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# TRANSATLANTIC

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## Cutter and Tailor Review

PROBABLY the mathematician sees less of the general scientific life about him than does any of his colleagues. The present report, therefore, may much resemble the annual review of the Royal Academy Salon by the *Cutter and Tailor*, in which the entire space is devoted to sartorial criticism of the work of the artist. Thus it is only where the scientific work impinges on mathematical interests that it comes to my attention.

### GENETICISTS AND PHYSIOLOGISTS TURN TO MATHEMATICS

One of the most striking developments is the growing interest of the geneticist in mathematical technique. Julian Huxley and his school here and Volterra and his school in Italy are carrying out a mathematical analysis of the processes of natural selection. The physiologists, too, are bringing to the mathematicians all sorts of weird differentio-integral equations for solution, and, strange to say, the mathematicians are solving some of them. In this connection, let me say a word in praise of the high level of mathematical intelligence that here characterizes the scientists in other fields. This probably depends on the old Cambridge mathematical tradition, although it is many years since the Mathematical Tripos was destined for others than mathematicians.

It is interesting to speculate how Cambridge became the mathematical center, as opposed to classical Oxford. This clearly does not date back beyond Newton, for if Cambridge had her Barrow before him, Oxford had her Wallis. Probably under the influence of Newton's prestige — so Professor Hardy tells me — the Mathematical Tripos became an examination for all honor students, whatever their real interest, and a necessary prelude to distinction in classics. While the Tripos of the first half of the last century did not go into very deep mathematical topics, it certainly turned the interest of many of the ablest men to mathematics, and under its influence it was Cambridge rather than Oxford which attracted such men as Clerk Maxwell and Cayley. For a long time the Tripos examination remained singularly disconnected, with the research done by the abler mathematicians and mathematical physicists, but the presence of this group led to the formation of a professional spirit in mathematics which led ultimately to the professionalization of the Tripos itself.

Whether it is the Tripos training, and the need of summoning all one's mathematical technique to one's aid in a period of three hours, or whether it is the British spirit of sportsmanship, which leads them to value a hard mathematical problem much as they might value a difficult traverse in rock climbing, British mathematical technique is the envy and the despair of the American. Individual Continentals are unquestionably their equals, but the general level of Continental technique, even among the very best mathematicians, is much

lower. Combined with the concentration of English mathematics and mathematical physics in Cambridge, where a large proportion of the undergraduates are men who have already received their degree from some provincial university, the effect is dazzling in the extreme.

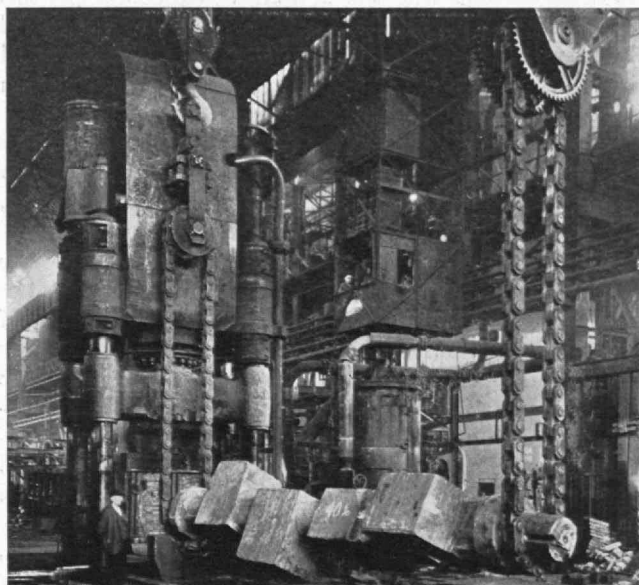
A young American acquaintance of mine wrote me recently his impression that Cambridge is primarily a social institution, and indeed there is nowhere a more delightful social life. However, the scholars work, and work hard. What deceives the uninitiate is that a very large part of this work is done in the many vacations which occupy so much of the year, and that much of the term time, as is right and proper, is devoted to normal, intellectual contact with one's fellows. But I certainly envy the dons here their students!

### RECONCILEMENT OF QUANTUM THEORY AND RELATIVITY?

One hears many rumors, which I neither venture to confirm nor to deny, that the quantum theory is near its final resolution and reconciliation with relativity. One of the younger dons here, L. C. Young, the son of W. H. Young, is following the very interesting line of stating the postulates of the quantum theory in a sort of Stieltjes Integral form, favoring neither the discrete nor the continuous. This is, at least, an interesting lead towards the harmonization of the wave and the particle.

As to lighter gossip, a pseudo-scientific thriller from the distinguished pen of J. B. S. Haldane has just appeared in the *Strand Magazine*. It hits off the international background of the professional scientist with remarkable skill. We are eagerly awaiting more goods from the same shop.

NORBERT WIENER



Courtesy German Tourist Information Office

A crank shaft in the making at the works of the Dortmunder Union, Germany

# ELECTRICAL ENGINEERING AT M.I.T.

## *A Report of a Joint Meeting of the Visiting and Advisory Committees of the Department of Electrical Engineering*

### *Introduction*

VISITING and Advisory Committees of the Department of Electrical Engineering recently met at the Institute and the following were in attendance:

#### *Visiting Committee of the Corporation*

J. E. Aldred of New York  
Alexander Macomber, '07, of Boston  
Maurice Scharff, '09, of Pittsburgh

#### *Advisory Committee of the Department*

Charles L. Edgar of Boston  
H. P. Charlesworth, '05, of New York  
C. E. Eveleth of Schenectady  
John R. Freeman, '76, of Providence  
W. S. Lee of Charlotte, N. C.  
Kenneth S. May, '09, of Boston  
Charles A. Stone, '88, of New York  
A. H. Wenzell, '17, of New York

After an inspection of the laboratories and quarters of the Department, the group assembled for consideration of department affairs, being joined in its deliberations by the senior faculty members of the department staff representing its major activities.

An extended discussion of the problems of the Department, its educational ideals and future activities was had and Messrs. Macomber, Edgar, and May were appointed a subcommittee to correlate the information presented, give further study to the problems revealed, and prepare a report to be submitted to a later meeting of the joint committee to be held in New York prior to the next meeting of the Corporation.

In accordance with this action, the subcommittee has prepared this summary of the situation as developed by them, aided by a considerable mass of detail prepared by the department staff, which is submitted as an appendix to this report.

The attention of all members of the joint committee is urgently directed to a study of this appendix, which presents in impressive form the problems before us, illustrated concretely by statistics and graphs.

Your Committee has been greatly impressed with the calibre of the staff of the Department which, under the leadership of Professor Jackson, is a virile organization of outstanding prominence in its field. It is doubted if any educational institution can present a personnel whose achievements in electrical engineering are as well recognized by the profession as at Technology. The inspiration of such an organization is incalculable and in no small degree has resulted in the large enrollment in this Course and the increasing numbers who come to us each year. Indeed, it is this situation which brings us face to face with the urgent necessity of a solution of the physical problems of the Department as well as the adoption of an educational policy consistent with the

factors before us. To grasp these problems clearly and with the necessary vision we must carefully consider the fields we are endeavoring to cultivate.

### *The Field of Electrical Engineering*

From the educational standpoint the field of electrical engineering lies in the economic applications of electricity and magnetism. This means on one side a comprehensive utilization of mathematics, physics, and economics with those engineering relationships involving natural forces. On the other side, loom those engineering accomplishments resulting from the development of our economic life, the development of which must be extended largely through the solution of many problems which expand the scope of our activities to almost an infinite limit.

### *Economic Relationships*

The work of the Department along creative lines is strongly advanced and the contacts with those intimately related problems of mathematics and physics are well established. On the other hand, the partnership necessary in the development of the applications of electricity and its economic influence upon the social existence offers an impelling opportunity for study. A great field lies before the Department in this phase of its possible work through investigatory problems in establishing facts and relationships now somewhat apparent but not fully developed. In this field, coöperation with eminent individuals in the profession should be encouraged, and coöperative action with the Departments of Economics and Business Administration in the development of selected upper-class students offers great possibilities of fruitful work. Indeed, it is felt that fully as much can be accomplished along this line as has already been developed in fundamental work of mathematical and physics relationships with electrical engineering.

### *Future Developments*

The quarters occupied by the Electrical Engineering Department in the present buildings of the Institute were planned more than 16 years ago and had in mind a maximum growth which might include 50 graduate students, 75 seniors, and a corresponding number of junior and sophomore students, which was the highest estimate which appeared likely to be the demand for a long period of years. This growth has long been exceeded and at the present time the number of students which must be dealt with in the provided space aggregate 101 graduate students, 107 seniors, and corresponding numbers of junior and sophomore students. In other words, the Department is now handling its students in quarters designed for 60% of that number. It is doubtful if any other department of the school is now so handicapped. The bursting point is reached.



The Committee, therefore, faces the question of whether it is preferable to limit the number of students more nearly to those for which space was originally provided, thus reducing the numbers even now in the Department, or to recommend that additional space shall be provided to meet the development not only of the present but of future years. Associated with this point is also the relation which this Department should bear to the economic applications in electrical engineering in addition to the active relation which it now holds to the immediate utilization of discoveries in physics and mathematics.

It is apparent that the available space for laboratories and offices is now severely overcrowded, and that the Department is functioning in quarters designed for approximately 40% less students than are now in attendance. At the present time there are about 400 students enrolled above the level of the freshman year, of which over 100 are in the senior class and 100 are enrolled in graduate work. Even this enrollment cannot be continued with due regard to maintenance of the standard of instruction without additional facilities. The Corporation, therefore, must face this basic problem of limiting graduate work and senior students, or be reasonably assured that the natural growth for the next period of years is to be provided for.

The total floor area originally allotted to the Department is 44,290 square feet. Today, with 400 students above the freshman year, the area has been reduced to 42,445 square feet. If we are to take a broad view of the future and meet the responsibilities which are undoubtedly to be thrust upon us in this phase of engineering education, the Department today should have assigned to it at least 68,000 square feet to be consistent with the original layout.

If in the next decade we can anticipate providing for 600 students above the freshman year, of whom approximately 150 compared to the present 100 are to be graduate students, the required area becomes approximately 100,000 square feet. The addition of a wing extending from the back of the present building at the east, making a section balancing the Infirmary section, is the logical extension of the present facilities of the Department, to which it would be adjacent. Such a wing, constructed and assigned to the Department of Electrical Engineering, would give approximately 55,000 square feet of additional floor space, which would meet the estimated requirements presented herewith.

It seems to the Committee, in view of the services which graduates of this Department may be expected to render to the profession, that it would be a shortsighted policy to consider at this time an unreasonable restriction in its growth. The Committee believes that any lowering of the standards of achievement on the part of students and staff resulting from curtailment of activities would injure seriously our reputation.

A virile and outstanding educational organization has been built up and to throttle the usefulness of one of the outstanding contributions of Technology to engineering education cannot be contemplated. The Electrical Engineering Course at Technology is being increasingly recognized by students from other institu-

tions as the outstanding opportunity for continuing advanced professional work in the field. To maintain this leadership is our responsibility, and, in our opinion, it cannot be shirked.

### Conclusions:

The subcommittee of the joint committee, after careful consideration of the foregoing, based upon the detailed data in its possession, concludes:

1. The Committee is impressed with the fundamental policies of the Department with reference to the development of the curricula, and especially endorses the development of the field of economic applications of Electrical Engineering involving closer coöperation with the Departments of Business Administration and Economics as well as expanding the existing coöperation with the Departments of Physics and Mathematics.
2. The Committee is also of the opinion that the demand of industry for highly trained electrical engineers, cannot reasonably be expected to diminish in the near future; but that, on the contrary, in view of the constantly expanding applications of electricity, they may confidently be expected to continue or increase. In view of the above considerations, the Committee believes that the following additional conclusions must logically result.
3. The Department of Electrical Engineering should provide over the next ten years for handling a total of 600 students above the freshman year, of which approximately 150 may be graduate students. After such a period the future requirements should be considered again with regard to the demands of the industry, the general growth of the situation, and its educational policy.
4. The Committee recommends to the Corporation serious consideration of the present severe overcrowding of the Department and that additional space facilities be provided at the earliest possible moment.
5. While the demands of the various phases of the Institute's activities can always be expected to be increased, and properly so, as incident to the healthy state of any educational institution, it must be recognized that Electrical Engineering is one of the major and basic professions, whose graduates contribute most effectively to the progress of this nation, and the inspiration of the goals already reached by Technology men sets a mark which must not be allowed to diminish in influence.

(Signed)

CHARLES L. EDGAR

KENNETH S. MAY

ALEXANDER MACOMBER, *Chairman*

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*The appendices contained data relating to the growth of the Electrical Engineering Department in numbers of staff, numbers of students, space occupied, and budget for more than a decade, which were associated with a statement of the needs of the Department as they now exist. Copies of tables, charts, and text in blue print form were submitted to the Corporation.*

# THE INSTITUTE GAZETTE

## Academic Ambassadors

**W**ITHIN recent months the Institute has appointed a national group of 55 honorary secretaries who will represent Technology in various cities in this country, Canada, and Mexico. Chosen for their experience in various fields of engineering and business, these honorary secretaries will provide sources of qualified first-hand information on education in science and engineering, architecture, and business and engineering administration at Technology.

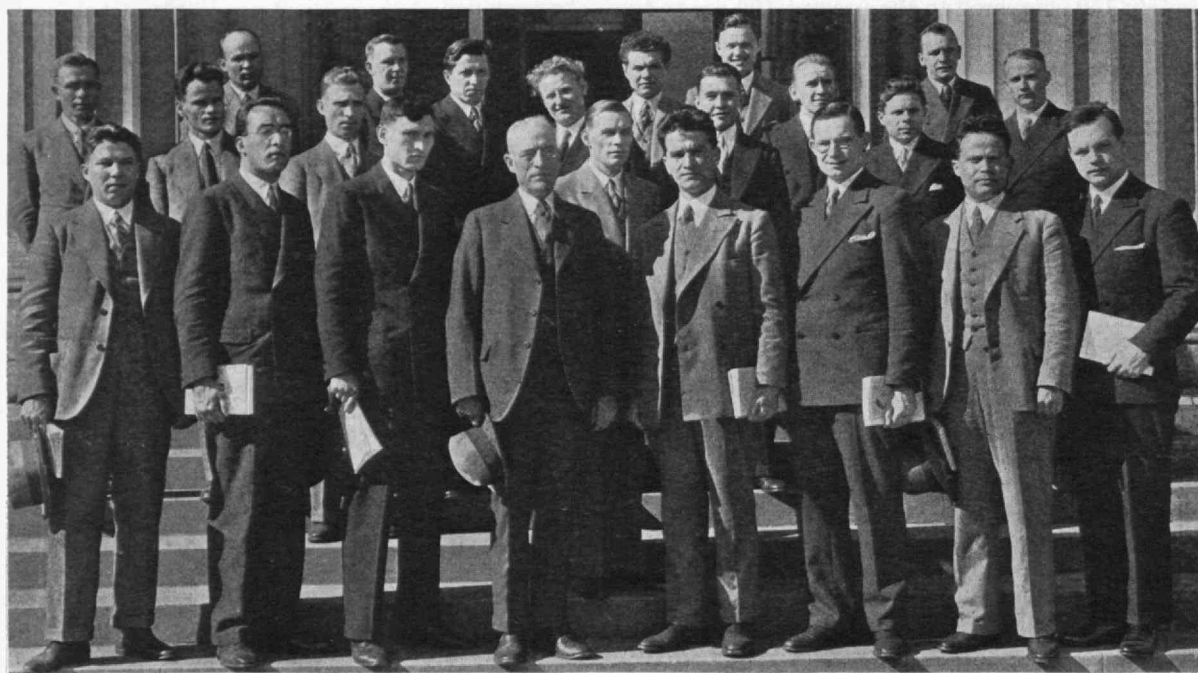
These academic ambassadors will consult with prospective students from their districts and assist them in determining their qualifications for a technical education. Their work assumes particular importance because of the rapid growth in the number of applicants for admission to the Institute and the necessity for giving precedence to the best students.

Those who have been appointed to represent the Institute are: Charles W. Loomis, '16, *Detroit*; Willis F. Harrington, '05, *Wilmington*; Proctor L. Dougherty, '97, *Washington*; Denton Massey, '24, *Toronto*; Robert S. Breyer, '10, *Los Angeles*; George A. Sonneman, '90, *Spokane*; Walter H. Trask, Jr., '06, *Salt Lake City*; Edward M. Brickett, '20, *Allentown*; Dwight E. Aultman, '23, *Oklahoma City*; Ralph C. Geckler, '22, *Cleveland*; Bransford W. Crenshaw, '24, *Kansas City, Mo.*; George R. Norton, '07, *San Francisco*; Edward W. Noyes, '21, *Scranton*; Stuart M. Boyd, '18, *New Haven*; John T. Nichols, '22, *Pittsburgh*; Earl S. Bardwell, '06, *Great Falls*; William N. Todd, '04, *Portland, Maine*; F. Gurney Fine, Jr., '26, *Philadelphia*; Charles G. Merrell,

'88, *Cincinnati*; Eugene S. Weil, '21, *St. Louis*; Richard T. Lyons, '17, *Tulsa*; Harold O. Bosworth, '02, *Denver*; John F. Ancona, '03, *Rochester*; George D. Camp, '16, *Mexico City*; Charles W. Drew, '19, *Minneapolis*; C. Snelling Robinson, '84, *Youngstown*; Max L. Waterman, '13, *Bridgeport*; Duncan R. Linsley, '22, *New York City*; Neal E. Tourtellotte, '17, *Seattle*; Frank F. Bell, '10, *Dallas*; William H. Bassett, '91, *Waterbury*; Count B. Capps, '20, *Fort Worth*; Charles H. Chatfield, '14, *Hartford*; Howard R. Stewart, '17, *Worcester*; John L. Parsons, '17, *Erie*; Frederick W. Barker, Jr., '12, *Syracuse*; Karl A. Pauly, '96, *Schenectady*; Charles H. Warner, '89, *Fall River*; E. B. MacNaughton, '02, *Portland, Ore.*; William A. Kemper, '04, *Butte*; Harry Webb, '09, *Memphis*; Clarence E. Gage, '05, *Evansville, Ind.*; Frank Hayes, '90, *Duluth*; Andrew B. Sherman, '06, *Fitchburg*; Burt R. Rickards, '99, *Albany*; Charles W. Johnston, '05, *Norfolk*; Edwin A. Gruppe, '22, *Utica*; Ray P. Dinsmore, '14, *Akron*; Terrell Bartlett, '06, *San Antonio*; George B. Forristall, '11, *Houston*; Paul E. Chalifoux, '02, *Birmingham*; Thomas C. Keeling, '07, *Nashville*; John L. Porter, '00, *New Orleans*; Frank D. Rash, '01, *Louisville*; and John H. Ruckman, '10, *Topeka*. Horatio N. Parker, '94, *Jacksonville*; Harvey M. Mansfield, '83, *Tampa*; Percy H. Thomas, '93, *New Jersey District*.

## Polls

**R**EGISTRATION as of the third day of the academic year 1931-1932 (the final official count for the archives is made November 1) showed a student body of 3,162 compared with 3,187 a year ago, a decrease of 25



M.I.T. Photo

Twenty-two of the twenty-three students from the U.S.S.R. who were this year registered at the Institute (see page 136). Dr. Tryon, the Institute's Director of Admissions, stands fourth from the left



M.I.T. Photo

The students' commons room in the south end of Munroe (James P. Munroe, '82) Hall, one of the dormitories in the alumni dormitory group. This commons room has been named the "Burton Room" after former Dean Alfred E. Burton

or under one per cent. In an early September forecast published in the October Review, Registrar J. C. MacKinnon, '13, expected a falling-off of 107, or three per cent. His preliminary figures, however, failed to take into account 21 "Fifth-Year Architects," a group present on the rolls for the first time this year, inasmuch as the five-year program leading to the bachelor's degree in Course IV went into effect in the fall of 1927. Also, the belated arrival of 23 Russian government students (see page 88) was, of course, unforeseen. Deducting these 44 from Mr. MacKinnon's predicted deficit of 107 indicates that his early estimates varied but 38 from the actual figures. He almost duplicated the accuracy of his last year's forecast in the Review for October, 1930.

The comparative registration by classes this year and last year follows:

	Sept. 30, 1931	Oct. 1, 1930	Difference
First Year	630	737	-107 or 14.5%
Second Year	659	667	-8 or 1%
Third Year	618	599	+19 or 3%
Fourth Year	623	614	+9 or 1%
Fifth Year (Course IV)	21	0	.....
Graduate Students	561	512	+49 or 10%
Unclassified	50	58	-8 or 14%
Total	3,162	3,187	-25 or 1%

Changes in the registration of Departments which now have more than 200 students are given herewith:

	Sept. 30, 1931	Oct. 1, 1930	Difference
Electrical Engineering (Courses VI, VI-A and VI-C)	498	521	-23 or 4%
Chemical Engineering (Courses X, X-A and X-B)	402	403	-1 or under 1%
Engineering Administration (Course XV)	380	346	+34 or 10%
Mechanical Engineering (Course II)	339	362	-23 or 6%
Architecture (Courses IV and IV-A)	238	271	-33 or 12%
Civil and Sanitary Engineering (Courses I, I-A and XI)	236	244	-8 or 3%

The following have for this year an enrollment of less than 200, but more than 100: Aeronautical Engineering (Course XVI) 188, down 44 from 1930-31; Chemistry (V) 156, up 10; Physics (VIII) 124, up 45; Mining Engineering and Metallurgy (III) 113, up 12; Naval Architecture and Marine Engineering (XIII, XIII-A and XIII-C) 111, up 23; Biology and Public Health (VII) 100, down 1.

Building Construction (XVII) has 68 students, down 15 from last year, and the following now have less than 50 students registered: Electrochemical Engineering (XIV) 46, up 9; General Engineering (IX-B) 41, down 3; Mathematics (IX-C) 32, up 5; Geology (XII) 16, down 2; Army Ordnance 11, up 1; Fuel and Gas Engineering 9, up 2; General Science (IX-A) 4, down 5.



Graduate students this year are most numerous in: Chemical Engineering (X and X-A) 106, down 31 from 1930-31; Electrical Engineering (VI and VI-A) 92, down 5; Chemistry (V) 72, up 12; Civil Engineering (I and I-A) 58, up 25; Mechanical Engineering (II) 47, up 11; Physics (VIII) 34, up 17.

### *U.S.S.R. Students*

**T**HE Russian government students mentioned above are part of a group of 52 permitted to enter the United States by arrangement with the Department of State at Washington. Their admission, both to this country and to Technology, has been allowed with the express understanding that they come solely for study and that they will not take part in any discussions of a political nature.

Each of the 23 registered at Technology is a graduate of a Russian college or university, and has had more or less practical engineering experience. One man is classified here as a sophomore, 11 as juniors, three as seniors, and eight as graduate students. All ratings, however, are provisional for the first term only and are subject to revision at the midyears. Civil and Mechanical Engineering each have six, Electrical Engineering and Naval Architecture have three apiece, Chemical Engineering has two, while the remaining three are taking Mining Engineering, Electrochemical Engineering, and Building Construction.

Besides the 23 at M.I.T., six are at Harvard and the remainder is distributed between Cornell, Columbia, Lehigh, Wisconsin, Purdue, Colorado School of Mines, and Carnegie Institute of Technology.

### *Research Council Tour*

**T**HE second tour of research laboratories sponsored by the Division of Engineering and Industrial Research of the National Research Council brought to Technology on October 6 nearly 60 leading bankers, economists, and industrial executives.

In a brief address of welcome, Dr. Compton described the primary purpose of the Institute as service to the community through application of science and the arts. The first and fundamental method was the training of young men to take an effective part in the conduct and development of technical industries and professions. Then there was pure research to add greatly to human knowledge and to lay the foundation for the as yet unconceived engineering developments of the future. In applied science and engineering there was the development of new instruments, new methods, and the improvement of old ones for the benefit of industry, as well as the improvement of man's physical environment to increase his power. President Compton described the facilities of the Institute available for helping industry in the solution of its problems.

Professor Dugald C. Jackson, head of the Department of Electrical Engineering, and chairman of the engineering and industrial division of the Council, commented upon its functions in the promotion of research and the understanding of the methods used in modern scientific investigation. He spoke of the benefits to be derived by executives in many fields from the interchange of ideas and observations during these tours.

At the Institute the group were shown various research projects indicating what it is doing to assist industry, and in fundamental investigations which hold rich promise for the future.

President Compton and Professor Jackson joined the group at Cambridge for visits to other cities.

### *Exchequer*

**F**ISCAL 1931, which ended for Technology on June 30 last, was summarized in an 80-page document presented to the first fall meeting of the Corporation by the Treasurer, Everett Morss, '85. It revealed that the Institute's net operating income, which had exceeded two and a half millions in 1928-29 and 1929-30, had for 1930-31 passed the mark of two and three-quarters millions. To be exact, it was \$2,880,131.40.

Capital gifts (not including those to The Technology Loan Fund) during the year amounted to \$1,189,340, or \$599,901 more than in fiscal 1930. They included \$830,046 as a bequest of the late Harriette A. Nevins to form the "George Blackburn Memorial Fund," the income of which is to be used for general purposes of the Institute, and an additional \$200,000 from the estate of Henry Clay Frick. This brings the total amount received by Technology under the will of Mr. Frick to \$943,556.38. Miscellaneous gifts during fiscal 1931 were \$149,939, or \$86,131 more than in fiscal 1930.

Gross expense for the year exceeded gross income by \$184,950 and net expense exceeded net income by \$37,907, leaving the current deficit shown on the Treasurer's balance sheet as \$14,124. Income from students was \$1,321,826, or \$53,957 more than in fiscal 1929. Of this, \$26,861 was occasioned by increased income from regular tuitions, \$11,829 from the greater return of the 1930 summer session as compared with that of 1929, and \$7,957 was increased net receipts from dormitory operation.

The Institute's net operating expense during fiscal 1931 was at the rate of \$7,994 per day (not including \$2,250 per day for research and special payments) as against \$7,600, \$7,150, \$6,300, \$6,200, and \$6,000 in the five previous years. Academic expenses increased \$163,425, or 10.1% over 1930; administration costs increased \$28,460, or 8.8%; plant operation decreased \$9,765, or 2.3%; miscellaneous expenses decreased \$37,503, or 9.0%.

Capital additions during the year of \$672,737 to the Institute's educational plant and \$672,602 to its investment funds were noted. The first of these was principally for dormitories and for initial payments on account of the new physics and chemistry research laboratory (Building 6) and the spectroscopic laboratory. The book values on June 30, 1931, of the items "Land, Buildings and Equipment" and "Endowment Assets" were \$14,682,736.55 and \$33,821,587.78, respectively. "Taking the General Investment Account as a whole," says Mr. Morss, "the present market value [as of June 30, 1931] is \$576,000 less than the book value. This is covered by the Endowment Reserve Account which now amounts to \$606,000."

The reader is referred to President Compton's article in the supplement of last July's Review for supplementary data on Institute finances.

## 154th Council Meeting

BRADLEY DEWEY, '09, this year President of the Alumni Association, might well have felt pleased — and he no doubt did — with the first meeting of the Council over which he presided, that on October 26. With 83 members and guests present, it was one of the largest Council meetings ever held. And there is no hazard in making the statement that the dinner served before the meeting by the Walker Memorial dining service was the best dinner the Council ever had in that building. Not even Allan W. Rowe, '01, was heard to complain!

But a large attendance and a satisfying dinner were not the only things for which President Dewey might have felt grateful. Much business of a formal, routine nature was quickly transacted and a program of speakers was presented which was so good that the President of the Institute, Dr. Compton, decided that the whole show should be moved to New York some time early in 1932. So much business was transacted and information declaimed that the meticulous Secretary, Professor Charles E. Locke, '96, required ten, single-spaced, mimeographed pages to record the minutes.

After the Council had voted that committees be appointed by the President of the Association to draw up resolutions on the deaths of Dr. Stratton and Mr. Howard A. Carson, '69, President Dewey presented the following new Technology professors who were guests of the Council: Commander H. E. Rossell, '15, Professor of Naval Construction, Department of Naval Architecture and Marine Engineering; Wilhelm Spannhake, visiting Professor of Hydraulics, Department of Mechanical Engineering; Ralph D. Bennett, Associate Professor of Electrical Measurements; Ralph E. Freeman, Associate Professor of Economics; Louis B. Slichter, Associate Professor of Geology; Philip M. Morse, Assistant Professor of Physics; and Wayne B. Nottingham, Assistant Professor of Physics.

The one new Term Member of the Corporation present, Henry E. Worcester, '97, was likewise introduced, though we are quite sure there was no one present who needed an introduction. Also presented to the Council were Frederic H. Keyes, '93, representative of the new Spokane Club; and Giles Taintor, '87, James B. Fiske, '31, Donald B. Gilman, '32, Robert G. MacKay, '33, and Henry D. Humphreys, '34, as representatives of their respective classes.

The Secretary then reported on the meeting of the Executive Committee which preceded that of the Council and Dr. Rowe reported for the Committee on Audit and Budget stating that "We have reviewed the several items in the auditors' report with much interest and find that in every way they have verified expenditures and income. On the authority of the statement of the accountants and auditors this Committee reports that the records of the affairs of the Association for the year as designated are entirely accurate."

The official business of the evening being over, President Dewey called upon Dr. Compton to describe his trip to the Pacific Coast last June and July and his visits with the Technology clubs in that section. Dr. Compton reported having found lively clubs.

President Dewey next presented in order Registrar J. C. MacKinnon, '13, Dean H. E. Lobdell, '17, Bursar H. S. Ford, and Professor L. F. Hamilton, '14, Chairman of the Dormitory Board. All of these men had been asked to talk on the various phases of the Institute's administration represented by their titles. Without supererogation and repetition we present the following important items, culled from the speeches of these four:

### REGISTRAR MACKINNON

The Institute's student body is increasingly cosmopolitan, only 55% of the students now come from New England, while 6% come from 40 different foreign countries. Approximately 30% of the undergraduates enter from other colleges.

The growth in the number of graduate students has been phenomenal. There were about 20 to 40 before the war, but in 1931 there were 600. The Institute has awarded one-third of the advanced engineering degrees given in the United States during the last decade.

### DEAN LOBDELL

In ten years dormitories have increased four-and-a-half fold and a system of student government has been evolved which functions most successfully. One of the most noteworthy advances of the Institute is the development of the Homberg infirmary and the care of student health. In 1920-21 the first aid room had 7,643 calls as against 28,119 this last year. Only eight contagious cases were found last year in a group of 3,200 students, but 930 students were discovered to have defects, of which 289 were of vision. The Infirmary had 355 patients or 2,005 bed days last year.

### BURSAR FORD

The Institute today has funds totalling \$35,000,000 and its buildings and grounds are valued at \$15,000,000. Princeton, by way of interesting comparison, has funds totalling \$25,000,000 and Harvard \$120,000,000.

The budget for the present year is figured on an operating income of \$3,100,000. Of this \$1,580,000 is expected from students — tuition, fees, net dormitory rentals, and so on; \$1,300,000 from investments; and \$220,000 from miscellaneous sources. Against this, the operating expense is: academic, \$2,059,000, of which \$1,716,000 is for teachers' salaries; administration \$341,000; plant operation and maintenance \$385,000; miscellaneous appropriations \$315,000.

In ten years, the total appropriated for teachers' salaries and academic expenses has doubled, while administration expenses have increased 50%. Miscellaneous appropriations have increased 200%, but plant operation and maintenance has remained at the same figure throughout the ten years, the increases in the plant repairs being offset by the continually reduced price of coal, of which we now consume 13,500 tons per annum.

The income from students this year requires constant attention and with the increase in tuition, it is hard to see how the Institute could carry on without the aid of the new Technology Loan Fund. Undergraduate scholarship aid has been awarded to 360 students; graduate scholarship aid, to 120. Loans averaging \$400



each have been granted to over 400 students and in spite of this, special arrangements for deferred payment of part or the whole of tuition and other fees extending for a week, a month, or throughout the term have been granted to more than 700 students. It is really astonishing how many students are attending the Institute whose families report an income of from \$1,200 to \$2,000 a year, in many cases with a number of dependents. How these men manage to come year after year and in some cases secure Master's degrees strains the imagination.

#### PROFESSOR HAMILTON

The Institute has probably the largest dormitory group in the country operating without proctors. Student government in these dormitories carries a very heavy load most successfully. The organization handles all routine discipline but major cases are taken over by the Dormitory Board to relieve the students of the disagreeable task of handling major offenses.

Students prefer adjoining or adjacent single rooms. The dormitories have developed strong, intramural athletic teams and they are allowed to use the Institute's athletic fields after 12:00 noon on Sunday.

### *Tech Show Moratorium*

**I**NEXORABLE fate overtook the Tech Show, the student activity venture begun at the turn of the century, on October 20, when a meeting of the Alumni Advisory Council and the Managing Board of the Show voted not to present any production this year. A week later, this action was ratified by the Institute Committee and the Tech Show passed into a limbo of pleasant memories and a deficit.

For the last five years, the Show has been struggling against insuperable odds. Student and alumni interest and support have declined, making it virtually impossible to secure sufficient income to support the activity. All who have been connected with the Show during this period — alumni, students, and coaches — labored valiantly to save it, and to all of these men great credit is due for their efforts to preserve an activity which, in its earlier years, flourished and constituted one of the major undergraduate activities.

In 1922 the total income of the Show was \$16,424.75, while the total expenditures were \$13,720.95, leaving a net gain of \$2,703.80. By 1931 the total income had dropped to \$3,754.14 and the expenditures were \$5,018.52, leaving a deficit of \$1,264.38. These figures contain almost the whole story of what has happened to the Show.

### *Honor Students*

**T**HE honors group plan in the Department of Electrical Engineering continues to be a source of encouraging reports. Representing as it does one of the pioneer efforts in American engineering education to provide exceptionally able students with greater opportunities for expression of originality and initiative, it is now in its seventh year of operation. The honors students in the Class of 1932 are: E. F. Cahoon, H. S.

Duncan, J. Eisler, J. C. Gibson, M. S. Hathaway, F. M. Ikuno, C. K. Jones, I. Kalikow, S. Lieben, G. A. Lowery, F. W. Pihl, W. R. Power, J. C. Rowe, P. B. Samuelson, T. R. Smith, H. A. Traver, and H. M. Wagner. Those in the Class of 1933 were: R. L. Brown, C. B. Bryan, J. D. Collins, F. P. Feustel, D. G. Fink, R. L. Fossett, W. A. Gray, E. L. Hume, T. C. Johnson, M. Levine, N. Levinson, W. R. Oppen, and W. G. Webster.

A recent elaboration of the plan provides for a comprehensive examination administered by outside examiners, invited from the electrical industries. The workings of the plan are being studied by other departments of the Institute and it is anticipated that variations of it will be adopted by them in the future.

### *Income of Technology Men*

**T**HE average salary of 1,344 Technology men who responded to a questionnaire sent out recently by The Review was revealed as \$7,073.67. The average income from investments was reported as \$5,836.17, and the average amount of life insurance carried as \$25,416.52. Six hundred and fifty-four of the men replying were 35 years old or younger; 513 were between the ages of 36 and 55; and 177 were over 55. The 1,344 replies came in response to 2,500 questionnaires sent to an alphabetical list of Review readers and represent a 54% response.

Of the men reporting under 35 years of age, the average salary was \$4,001.03 and the average income from investments was \$1,494.97. In this group, 39.8% owned homes with an average value of \$9,700.88. The average amount of life insurance per man was \$14,688.66. Eighty per cent owned cars.

Men in the prime of life, 36 to 55, are earning considerably larger incomes than the men under 35. The average salary for the 513 men reporting in this middle group was \$10,394.41 with an income from investments of \$7,511.90 per man. Sixty-three and four-tenths per cent owned homes with an average valuation of \$15,933.67. Eighty-five per cent owned cars.

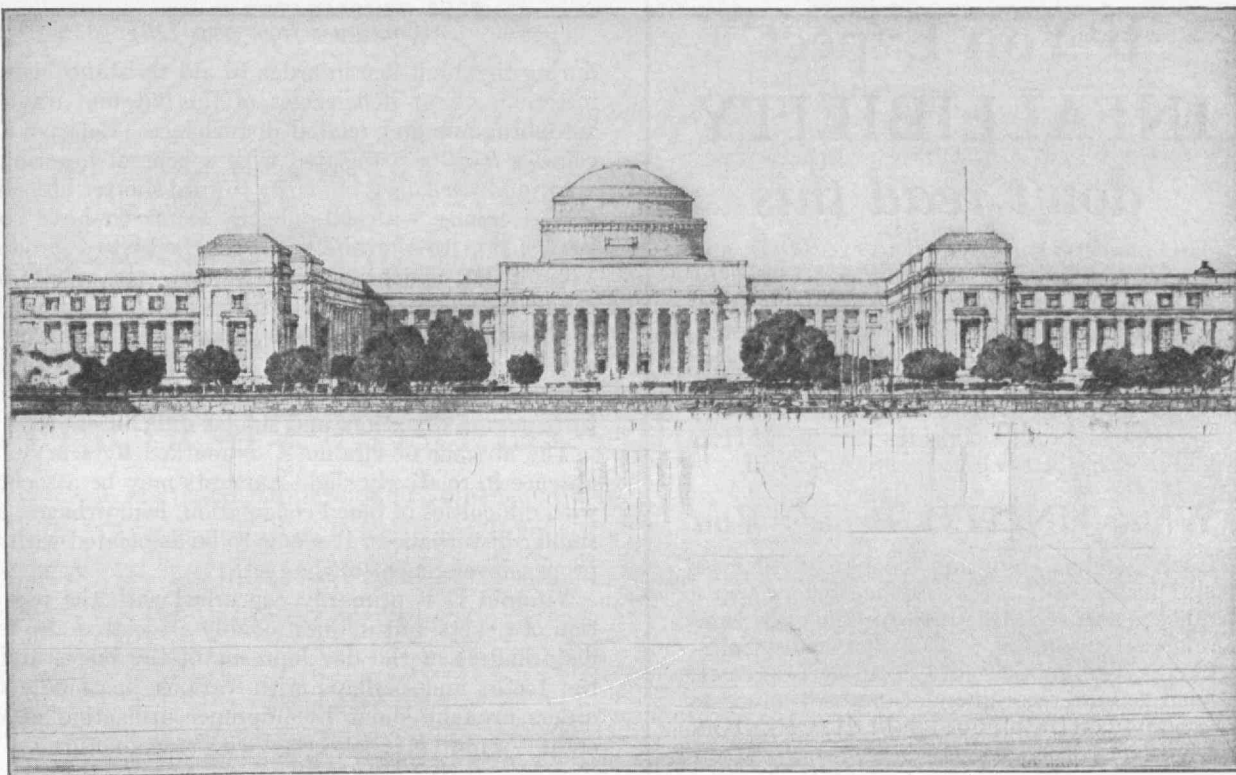
In the older group, 56 and over, 72.9% owned homes with a valuation of \$18,727.96 per home. The average income from investments of \$13,044.80 exceeded the average salary of \$11,750.97. The amount of life insurance per man was \$26,935.98. Only 79% in this group own cars.

These figures, while they have changed somewhat since this information was gathered, offer ample proof of the material value of scientific education.

### *History of English Wallpaper*

**"W**ALLPAPER, beyond question, is the most universal, as it is the most democratic, of the applied arts. Throughout the civilized world of today there is no other form of domestic decoration so generally adopted. It can be produced cheaply, and at the same time artistically, enough to give beauty to the humblest dwelling; in its highest grades, properly employed it can enhance as no other material those qualities, whether of space, pro- (Continued on page 146)





*For Christmas*

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*By Louis Conrad Rosenberg*

PUBLISHED BY THE TECHNOLOGY REVIEW

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## WHAT TO EAT

(Continued from page 116)

during the adult age in order to aid resistance against infection. Great deficiencies of this vitamin result in xerophthalmia and related disturbances. Relative deficiencies may be associated with a general lowering of vigor and perhaps a tendency toward shorter life. Vitamin A, along with vitamin E, seems to have some relationship to the ability of the body to reproduce. Vitamin B1, if deficient in large amounts, results in a condition called beriberi and polyneuritis. Vitamin B2, if deficient in large amounts, may bring about by its absence pellagra. Relatively slight deficiencies of this vitamin seem to be associated with loss of appetite, disturbances of digestion, and similar difficulties.

The absence of vitamin C is marked by scurvy. Its absence in relatively slight amounts may be associated with difficulties of blood coagulation, hemorrhages, and similar disturbances. It seems to be associated with the proper development of the teeth.

Vitamin D is primarily concerned with the prevention of rickets, but unquestionably associated also with disturbances of the development of the bones and of the teeth, and perhaps with various spasmodic disorders brought about by improper utilization of calcium. Vitamin E is concerned with reproduction.

**F**INALLY, we are concerned with the question of food sensitization. Here again medicine has barely opened a wedge into a vast, unexplored field. Enough has been done to indicate definitely that human beings may be sensitive to various proteins in foods, and that such sensitization may be associated with pain in the abdomen, disturbances of digestion, hives, eruptions on the skin of the type of eczema, migraine, and bronchial asthma. It has been thought possible that epilepsy, hay fever, congestion in the nose, pain and bleeding from the bladder, unexplained fevers, and even low blood pressure may be associated with sensitization to foods. Methods have been evolved, through diets that are free of certain foods and through skin sensitivity tests, for determining whether or not a human being is sensitive to certain food substances.

All that has here been said is an indication of the tremendous place that the scientific study of food has assumed in relationship to health and disease. Whereas 20 years ago the medical profession was primarily concerned with the use of medicinal substances in the control of disease, it is certain that today the chemical, physical, physiologic, and nutritional study of foods occupies a place at least equal in importance if not more important. The literature on the subject, even if it be limited to what has been printed (Continued on page 142)

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## WHAT TO EAT

(Continued from page 140)

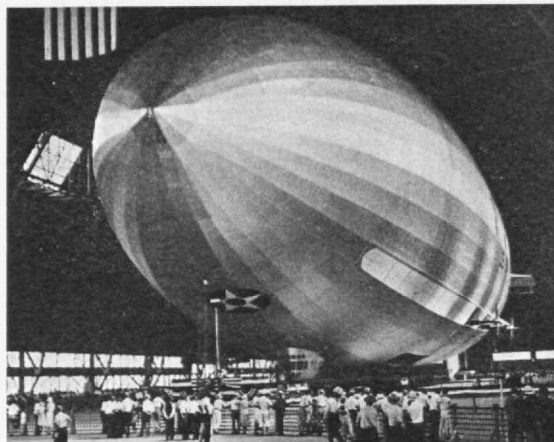
in the last decade, is vast and stimulating. Certainly the time may come when, through our knowledge of the relationship of foods to growth and health generally, we may produce bigger and better human beings than is possible today, human beings with a more powerful structure and far better equipped to resist disease.

IN THE midst of this evolution of knowledge regarding foods, the consumers, and particularly the medical profession, have been confronted with the fact that charlatans of one type or another have taken advantage of the newer knowledge to spread propaganda for food products beyond the actual values that they contain, and, indeed, to give the public a false impression of what can be accomplished by foods. Into this mass of mingled truth and deception has entered the Committee on Foods of the American Medical Association. This committee was created by the Board of Trustees of the Association to do in the field of foods what the Council on Pharmacy and Chemistry of the Association has done in the field of drugs and medicinal preparations.

The Committee proposes to verify the claims made for food products and to determine whether or not these claims are justified by the actual composition of the preparations. The necessity for understanding the importance of minerals in relationship to human health, the necessity of the vitamins for the prevention of deficiency diseases and for the insurance of adequate growth and resistance to disease, the development of new knowledge regarding various types of proteins, carbohydrates, and fats have made foods something beyond mere builders of energy for the human body.

The Committee on Foods has established certain principles by which it is guided in its judgment. It asks the appearance on the label of any food product of a descriptive statement showing exactly what the product is. The food industry is flooded with the use of fanciful titles for products which do not indicate in any way their actual ingredients. For example, it is important to know whether or not a tomato juice is canned fresh or boiled. It is important to know whether the food is or is not artificially sweetened. It is necessary to know the contents of a baby food. Thus one baby food, which has a figurative name indicating that it is like milk, is now described on the label as a food for infants derived from modified, fresh, skimmed cow's milk, the casein of which is rendered soluble with the addition of milk sugar, salts, milk fat, olive oil, coconut oil, and cod liver oil.

How is a person who is sensitive or allergic to wheat, barley, eggs, or some other substance to know whether or not the food he eats includes any of these substances? Since vitamins are of the greatest importance for the maintenance of health and for adequate growth, knowledge of vitamin content relative to the known content of substances rich in vitamins is important. When advertising claims are made, they must state the vitamin content in relationship to these known substances. Since there are various proc- (Concluded on page 144)



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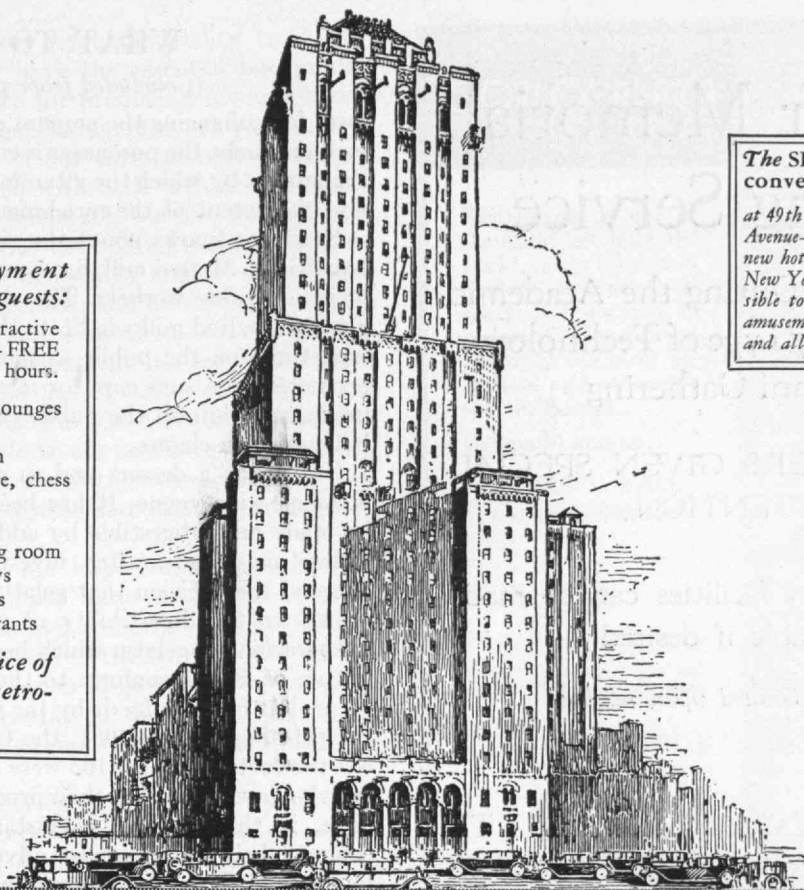
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## WHAT TO EAT

*(Concluded from page 142)*

esses for enhancing the amount of vitamin D in various food products, the purchaser is entitled to know not only the process by which the vitamin content is enriched but also the extent of the enrichment.

Everyone knows about the rise in the use of chocolate drinks. Malted milk has become the staple luncheon of innumerable workers. The claims for some of these glorified malted milks indicate that their manufacturers urge them on the public as panaceas. One of them is promoted as a sure cure for insomnia. The Committee proposes to inform the public concerning the inadvisability of such claims.

Gelatin as a dessert and as a food for invalids has attained wide vogue. It has been urged that milk can be made more digestible by adding gelatin. The Committee on Foods, after investigating the evidence, adopted the decision that gelatin cannot be considered an aid to the digestibility of milk or milk products. Preparations of gelatin which bear the seal of the Committee on Foods conform to the limitations placed on the claims for such foods by the Committee.

Up to September, 1931, the Committee had studied 541 products, of which 165 were accepted. Manufacturers who have submitted their products to the Committee have, in the majority of instances, been prompt to change labels and to correct advertising claims in order to make their products acceptable. The work of this Committee means great good for the American people.

## DO ENGINEERS INVENT?

*(Continued from page 119)*

were sent to the outstanding engineers in "Who's Who in Engineering" for 1925, who stated that they made inventions. There were 258 engineers who replied that they secured patents for their inventions. The following table gives the frequency of the number of patents obtained by them:

<i>Number of Patents</i>	<i>Number of Engineers</i>
1-9 .....	118
10-19 .....	41
20-29 .....	27
30-39 .....	8
40-49 .....	16
50-59 .....	7
60-69 .....	5
70-79 .....	2
80-89 .....	4
90-99 .....	..
100-199 .....	15
200-299 .....	5
400-499 .....	1
No Answer .....	9
Total .....	258

These engineers obtained on the average 27.5 patents, which indicates that they are an extremely active group of inventors. Of course, these results do not apply to all engineers inasmuch as the above figures were derived from a selected group.



Engineers undoubtedly have the ability to invent, and, in addition, they have the essential background and knowledge requisite for producing modern inventions. The day of the garret inventor has passed. It is noteworthy that some of our early pioneer inventions have been made by men with little technical training; and perhaps this was fortunate, for if they had been aware of all the difficulties and failures of those who preceded them, they might easily have become discouraged and might not have invented. But in view of the great increase of engineering and scientific data today and the growing complexity of technology, an inventor cannot proceed very far without having some knowledge of at least the fundamental facts in his chosen field. It follows that our engineers should be our best inventors, for they have all the necessary tools at their command and they live in a technological atmosphere bristling with many problems.

Yet the engineers of our large corporations have so far not produced very many basic inventions, although they have almost unlimited resources and facilities at their disposal. A tabulation of the revolutionary inventions made since 1889, when large corporate investigation may be said to have started, shows that only 12 out of 72 outstanding inventions have been produced by corporation research.

This lack of originality can probably be explained on the ground that engineers are employed chiefly to maintain or refine existing devices rather than to develop new ones. Nevertheless, engineers are responsible in a large measure for the amazing technological progress achieved in the industries. Although they have developed efficient mass-production methods and labor-saving machinery, they rarely create basic inventions upon which new industries are founded and developed. Pioneer inventive work has been chiefly performed by the individual inventor, working on his own, daring to ignore conventional engineering practice and text-book wisdom, fearlessly and courageously exploring new fields, in spite of being told that it cannot be done.

"From Noah's Ark down the ages to Marconi and the Wrights, it has generally been the so-called 'crazy' fellow, who didn't know any better and was working on his own who revolutionized affairs and opened up new horizons of progress by creating new industries and rendering old industries more or less obsolete. He had his own vision, made his own sacrifices to his own gods, and there was no man to say him nay; so he kept on trying till it happened. Railroads were absurd, steamboats were unsafe, explosives dangerous to use, wireless was a scientific curiosity, heavier-than-air machines were demonstrably impossible, gasified motor fuel was a waste of volumetric efficiency, and so on. Had the authorities of the time had their own way, we would have had no Judaism, no Christianity, no United States of America. Freedom of individual initiative and security of desired recognition and reward if successful, are what both common sense and history teach us to be essentials to big strides of progress. Much knowledge, experience, conservatism, organization, supervision, or authority are too often a handicap."\*

\* W. M. Grosvenor, *The Seeds of Progress, Chemical Markets*. Vol. 24, pp. 23-26 (1929).

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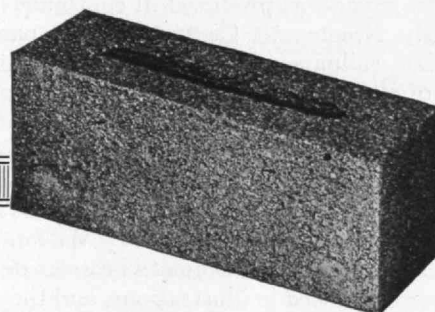
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## INSTITUTE GAZETTE

(Concluded from page 138)

portion, color, or appropriateness of background which the walls of even the finest apartments are intended to present. . . ."

Such is the opening paragraph of "A History of English Wallpaper, 1509-1914," which George L. Gilmore, '90, has recently presented to the Institute's Library. The book is of elaborate format, folio size, and contains 70 plates in full color, plus 190 illustrations in half-tone in addition to its comprehensive text. Its authors, Alan Victor Sugden and John Ludlam Edmondson (the latter's inscription to Mr. Gilmore is on the half-title page), have recorded fully the story of the English paper "stainers" from the opening of the Sixteenth Century to modern times.

Tapestries and painted cloth were the immediate forerunners of wallpaper. The oldest surviving paper wall decoration seems to be that discovered in the lodge of Christ's College, Cambridge University, the date of which is probably 1509. A simple design in black and white, it was printed by letterpress.

From simple, black letterpress, the art progressed to block printing, to hand-coloring, to color stenciling, and to John Baptist Jackson's chiaroscuro in the middle of the Eighteenth Century, whereby elaborate effects were obtained by block printing as many as ten shades from four oil colors.

Not until paper was produced in continuous lengths in the early Nineteenth Century was it possible to manufacture wallpaper at a speed bringing it within the reach of all. The first machine-made wallpaper was marketed in England in 1841, having been printed by a machine similar to that used in printing cloth. Technical advances rapidly followed, and artistic achievement received a great impulse from the movement to improve the minor and domestic arts initiated by William Morris.

This evolution the book presents in great detail. All periods are represented in illustrations, and they should be a source of ideas and inspiration, not only to manufacturers and interior decorators, but to the buying public as well. Mr. Gilmore has rendered a service in making this rare volume available to the Institute.

## TREND OF AFFAIRS

(Continued from page 130)

It is at high speeds that the air offers its greatest resistance. The motor car of today, traveling at 60 miles an hour, is using about half its power to overcome wind resistances. The same car streamlined would travel at 75 to 80 miles an hour with the same consumption of power. England, France, and Germany are already active in the development of streamlining, not only for automobile but in railway operation.

An "airship" model streamlined automobile, designed by Sir Denistoun Burney, was recently exhibited in England. This machine, powered with a 22 horsepower engine placed at the rear end, easily attained a speed of 80 miles an hour.

France hopes to cut her railway fuel bill one-third by streamline design in motive power and cars. M. Charles Maurain of the Aeronautics Institute of Saint Cyr has completed studies indicating that air resistance constitutes at least a third of the total resistance encountered by a train. Streamlining, he believes, would save France more than a million tons of railway fuel a year. The first step toward realization of streamlined trains is France's *Golden Arrow*, which operates on a run in northern France. The coaches of this train are so closely coupled that the entire train offers a remarkably low resistance to the wind. The rear car has a long, tapering aluminum cone to complete the streamlining effect.

In this country the Westinghouse Electric Company is carrying on laboratory experiments on the effects of streamlining on high-speed express and suburban train service. Dr. O. G. Tietjans, one of those working in the Westinghouse laboratories, estimates that streamlined express trains will reduce wind resistance by two-thirds and total train resistances to one-half. Streamlining, it has been found, is less important for slow, heavy trains than for high speed operation. The power to operate a light suburban train at 75 miles an hour, Dr. Tietjans believes, could be reduced one-half by streamline design.

Streamlining has been developed in its most spectacular form in airplanes. The engine cowling developed by the National Advisory Committee on Aeronautics has increased the speed of (Continued on page 147)

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## TREND OF AFFAIRS

(Continued from page 146)

commercial planes by 20 miles an hour, and proper streamlining is capable of reducing the resistance two-thirds.

Streamlining offers a stimulating field for investigations that may well have far-reaching influence on the design and efficiency of engines of transportation, not only upon the land and in the air, but on the sea. For improvements in ship design one looks not only to the naval architect, but to the hydraulics laboratory, where already much has been learned of the ways of water. And streamline design may soon be considered by the architect in his plans for the super-skyscraper of tomorrow.

### Information on Rubber's Microstructure

**D**ESPITE the universality of rubber, there are strange and challenging lacunæ in our knowledge of its structure and behavior. What is the nature of its microstructure, and how does that structure vary under strain? What is the law of elasticity for finite deformations? Does rubber behave as an undercooled liquid or as a crystalline solid, or in other words, does it exhibit relaxation of stresses or plasticity?

In an effort to fill some of these gaps in our knowledge, Professor H. Hencky of M.I.T. is conducting researches to determine the elastic properties of vulcanized rubber, and he has made available to *The Review* a memorandum of his progress. The microstructure of rubber, he believes, may be pictured as a homogeneous, amorphous, elastic jelly in which are imbedded small, thin bars, stiff, crooked at the ends, and of equal length.

"If these bars are so small that they cannot be seen and distributed in the so-called regular disorder of statistical mechanics, we have a seemingly homogeneous substance with a microstructure. Every strain has a reinforcing effect, creating a web of more resisting substance. The mathematical treatment shows that the apparent modulus of elasticity for uniaxial positive stress increases more rapidly with increasing strain than by negative stress. Neglecting first losses of the elastic energy and assuming — with a certain mental reservation — ideally elastic behavior, we can describe the properties of the compound examined by three elastic constants.

1. The bulk or compression modulus ( $K = 350,000$  to  $400,000$  lbs./sq. in.)
2. The modulus of shear ( $G = 8$  to  $10$  lbs./sq. in.)
3. The modulus of strain hardening ( $H = 55$  to  $60$  lbs./sq. in.)

"A striking feature of rubber is the difference in size between the bulk-modulus and the other elastic constants connecting liability to change of form with great resistance to changes of the volume. The enormous capacity for storing up elastic energy which we find in rubber is owned by no other material. In a cubic inch of rubber we can store in a perfectly reversible manner an elastic energy of about 150 foot-pounds, whereas we can get into a piece of the best (Concluded on page 148)



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## TREND OF AFFAIRS

(Concluded from page 147)

modern steel of the same size, having seven to eight times the density of rubber, only one-third to one-fourth of that amount. Rubber, nevertheless, is not an ideally elastic material. In fact, no body built up from dancing molecules can behave ideally.

"There are two influences causing a measurable permanent set:

1. Although plasticity — analogous to the metals — cannot be observed, certain fibers undergo rupture with increase of strain and naturally the strain increases with the frequency.

2. The heat movement of the molecules causes a breakdown of the elastic stresses in the amorphous part of the rubber compound.

"This phenomenon, known also under the name thermal plasticity, can be treated theoretically. Relaxation and elastic afterworking are consequences of it. The relaxation time is the elastic constant needed for the mathematical description. Some days after a change in loading, or after releasing, the velocity of strain slows down to a negligible amount.

"In total we have, therefore, four constants with which we can describe the elastic behavior of rubber; namely, the bulk-modulus,  $K$ , measuring the resistance to changes of volume; the modulus of shear,  $G$ , measuring the resistance to changes of form; the modulus,  $H$ , of strain hardening, measuring the influence of the reinforcing web on the changes of form; and the relaxation time,  $T$ , measuring the slowing down of relaxation and elastic afterworking. . . ."

Professor Hencky hopes to be able to show in a subsequent, more detailed publication that finite deformations have the power to reveal the microstructure of a material. Once this microstructure is known sufficiently, he believes, nothing can hinder a theoretical analysis which will shorten considerably the experimental work needed for the knowledge of a certain compound.

## EARTHQUAKE ENGINEERING

(Concluded from page 122)

No one who will study the earthquake history of the United States and Canada can fail to realize the need for further investigation in this field and in the development of a service which in the end will give ample returns in prosperity and in peace of mind.

The structural engineer is interested in safeguarding human life, in the economy of building, and in a more efficient disposal of material for greater resistance to earthquake shocks.

It is to the seismologist that the engineer will look for coöperation in obtaining accurate knowledge and data about earthquake motion, that will make it possible for him to design economically earthquake-resisting structures.



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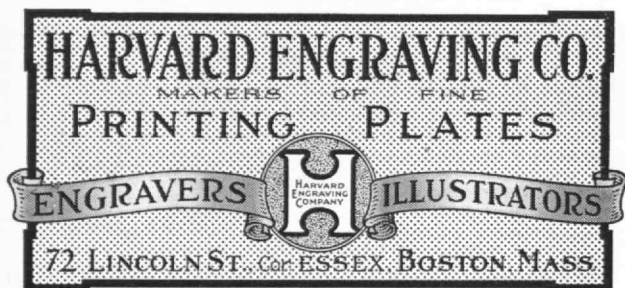
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# M. I. T. NEWS BULLETIN

PREPARED BY JOHN J. ROWLANDS, DIRECTOR, INSTITUTE NEWS SERVICE

*THIS News Bulletin is a continuation of the "Alumni News Letter" which last year the Institute's News Service sent to members of the Faculty, Corporation, Alumni Council, and to officers of local clubs. It has been President Compton's desire to make this bulletin of official Institute news available to as wide a Technology audience as possible. For this reason arrangements have been made to include it monthly in this supplement of The Review so that it will reach the 8,000 or more Technology readers of the magazine. The Director of the News Service will welcome any suggestions from any of the groups receiving this as to how it may be made more serviceable and informative.*

## Study of Academic Records of Undergraduates

A STUDY of the academic records of undergraduates at the Institute shows that those students in athletics, publications, and other activities are averaging considerably higher than the general scholastic average of the undergraduate body. This study, based on marks of June, 1931, was made by Dean H. E. Lobdell '17, and Registrar J. C. MacKinnon '13.

Of the 24 activity groups computed, 17 ranked well above the scholastic midpoint. The 237 men engaged in athletics as competitors or managers and the 180 students in publication activities were in the upper half, but 139 men interested in dramatic and musical activities were well below the general undergraduate average. The study also shows that the standing of 266 men holding managerial and executive positions in activities surpassed that of 383 younger men on the staffs of the various activities.

The highest average of a single group was 3.758, out of a possible five under the Institute's new rating system, and it was obtained by the members of Tau Beta Pi, the honorary engineering scholastic fraternity. This was to be expected, for the eligibility requirements of Tau Beta Pi include the proviso that each of its initiates must rank in the top quarter of his class with respect to academic record.

Notable on the list of activity groups having definitely superior ratings was the management of *The Tech Engineering News*, which stood next to and but 12 points below the Tau Beta Pi average. The captains of varsity sport teams were third, two points below *The Tech Engineering News* management. Then, in order, came the management of *The Benchmark*, annual publication of the Civil Engineering Summer Camp; the officers of the Combined Professional Societies; the staff of *The Tech Engineering News*; the management of *The Tech*; the Institute Committee;

the Dormitory Committee, which has charge of student government in the dormitories; and the management of *Technique*, the undergraduate year book.

In contrast with the excellent showing made by the activity groups, but five of the 28 recognized social fraternity chapters stood above the general undergraduate average. The 657 members of the 28 chapters of social fraternities, not, of course, including Tau Beta Pi, rated 16 points below the general average of the undergraduate body, and 24 points below the general average of the 589 residents of the dormitories.

The comparative standing of the 24 activity groups, the 28 fraternity chapters, and Tau Beta Pi appears on the next page.

## Technology Loan Fund

"EDUCATIONAL institutions that give financial assistance to students during the present trying economic period are not only benefiting the individual, but preventing a serious increase in unemployment," said Charles Hayden '90, of Hayden, Stone and Company, New York, in a communication read by President Compton at the annual meeting of the Technology Corporation on the afternoon of October 14.

In his letter Mr. Hayden, a life member of the Corporation, discussed the success of the Technology Loan Fund of \$4,200,000, established last year as an experiment in financing the education of worthy students. Mr. Hayden is chairman of the committee supervising administration of the fund, which was subscribed by a group of prominent alumni and friends of Technology under the leadership of Gerard Swope, President of the General Electric Company.

"As part of its plan to help students continue their education, the Institute this year expects to lend four times as much money as in any previous year," Mr. Hayden said. "Already 626 students have received grants from the Technology Loan Fund to the amount of \$224,000. We expect that amount will be increased by the end of the year.

"As an experiment in financing education, the Technology Loan Fund takes on new significance at a time when family resources are, in many instances, curtailed or completely exhausted. The Institute is complying to the highest degree with the request of President Hoover's organization on unemployment relief that everything possible be done to help students to continue their education."

Dr. Compton told the Corporation that in addition to grants from the Technology Loan Fund, the Institute has made scholarship grants of \$84,000

to 360 undergraduate students, while graduate students were given financial assistance to the sum of nearly \$68,000. More than 500 students were granted extension of time in which to pay their tuition.

Administration of the Technology Loan Fund within the Institute is carried on by a board consisting of President Compton, *ex officio*; Bursar Horace S. Ford; Dr. James L. Tryon, Director of Admissions; Assistant Bursar Delbert L. Rhind, Secretary; and Dean Harold E. Lobdell '17, Chairman. Seventy-six per cent of the applications for loans from the fund were approved by the board, and the average loan was slightly more than \$400.

The Technology Loan Fund Committee, of which Mr. Hayden is chairman, includes President Compton, Gerard Swope '95, Edwin S. Webster '88, Pierre S. du Pont '90, and John E. Aldred.

## Electrical Engineering Colloquia

THE first of a series of colloquia given by the Department of Electrical Engineering at the Institute was directed on November 2 and 3 by Mr. G. A. Randall of the Research Department of the Western Union Telegraph Company. Mr. Randall took for his subject "The Development in Problems of High Speed Cable Telegraphy."

On November 16 and 17 Mr. Frank M. Carhart '05, of the firm of Jackson and Moreland, discussed "Engineering Cost Studies." "Problems of Street Lighting Design" were taken up at a colloquium the following week, led by Mr. C. A. B. Halvorson, consulting engineer, and Mr. E. M. Crawford of the Street Lighting Department of the General Electric Company.

Subsequent colloquia to be held during the year will include "The Development of Instruments for the Direct Observation of Performance Characteristics of Communications Equipment," by Mr. J. Warren Horton '14, chief engineer, and other members of the engineering staff of the General Radio Company, and "Induction Motor Design," by Mr. Charles J. Koch, Jr., of the Induction Motor Department of the General Electric Company.

The series of colloquia, offered for the past six years, has been made possible through the coöperation of manufacturing, operating, and engineering organizations in the electrical field. The discussions are open to seniors, graduate students, and junior honors students, and are designed to acquaint them with the application of the fundamental sciences, especially mathematics and physics, to particular engineering problems.



### COMPARATIVE SCHOLASTIC STANDINGS OF UNDERGRADUATE GROUPS BASED ON JUNE, 1931, RATINGS

	Average		Average
1. Tau Beta Pi.....	3.758	23. Phi Mu Delta.....	3.13
2. T. E. N. Management.....	3.63	$\Delta$ GENERAL AVERAGE,	
3. Varsity Sport Captains.....	3.61	ALL UNDERGRADUATES	3.094
4. Benchmark Management.....	3.49	24. Sigma Alpha Epsilon.....	3.09
5. Officers Combined		25. Wearers of the "T".....	3.08
Professional Societies.....	3.47	26. Kappa Sigma.....	3.08
6. T. E. N. Staff.....	3.45	27. Delta Kappa Epsilon.....	3.07
7. The Tech Management.....	3.44	$\Delta$ Average of the 139 men en-	
8. Institute Committee.....	3.38	gaged in dramatics and musical	
9. Dormitory Committee.....	3.351	activities.....	3.068
10. Technique Management.....	3.35	28. Sigma Nu.....	3.05
11. Architectural Student		29. Alpha Kappa Pi.....	3.04
Council.....	3.34	30. Lambda Chi Alpha.....	3.01
12. Sigma Omega Psi.....	3.33	31. Phi Beta Epsilon.....	3.00
13. T. C. A. Cabinet.....	3.30	32. Tech Show Management.....	2.99
14. Voo Doo Management.....	3.271	33. Chi Phi.....	2.98
15. Phi Beta Delta.....	3.27	34. Delta Upsilon.....	2.971
$\Delta$ Average of the 266 men hold-		35. Officers of the M.I.T.A.A.....	2.97
ing managerial and executive		36. Delta Tau Delta.....	2.97
positions in activities.....	3.267	37. Phi Gamma Delta.....	2.96
16. Wearers Varsity Athletic		38. Tech Show Cast, Chorus and	
Insignia other than "T".....	3.24	Orchestra.....	2.95
17. Sigma Alpha Mu.....	3.23	39. Voo Doo Staff.....	2.88
$\Delta$ Average of the 237 men en-		$\Delta$ Average of the 657 members of	
gaged in athletic activities.....	3.213	28 social fraternities (Does not	
$\Delta$ Average of the 180 men en-		include T.B. Pi).....	2.93
gaged in publication activities.....	3.212	40. Beta Theta Pi.....	2.842
18. The Tech Staff.....	3.21	41. Alpha Tau Omega.....	2.841
$\Delta$ Average of the 649 men in 24		42. Theta Delta Chi.....	2.840
activity groups.....	3.206	43. Technique Staff.....	2.81
19. Combined Musical Clubs		44. Psi Delta.....	2.79
Performers.....	3.20	45. Phi Kappa Sigma.....	2.77
20. Sigma Chi.....	3.19	46. Theta Chi.....	2.76
$\Delta$ Average of the 383 men on the		47. Phi Kappa.....	2.68
staffs of activities but not hold-		48. Phi Lambda Alpha.....	2.66
ing managerial or executive		49. Delta Psi.....	2.64
positions.....	3.164	50. Combined Musical Clubs	
21. Varsity Sport Managers.....	3.15	Management.....	2.59
$\Delta$ Average of the 589 Dormitory		51. Phi Sigma Kappa.....	2.58
residents.....	3.15	52. Theta Xi.....	2.42
22. Dramashop Management.....	3.14	53. Alpha Phi Delta.....	2.39

### Significance of National Research Council

THE significance of the National Research Council was well indicated in an address by Professor Dugald C. Jackson, Head of the Department of Electrical Engineering, and Chairman of the Division of Engineering and Industrial Research of the Council, before members of the recent Council tour of laboratories, which is discussed elsewhere in The Review. Professor Jackson drew attention to the fact that one of the functions of the Council is to aid in the promotion of research and the understanding of the methods used in scientific investigations.

"The Council," Dr. Jackson explained, "is a coöperative organization of the scientific men of America. Its members include, however, not only scientific and technical men but also business men interested in engineering and industry.

"It was established in 1916 by the National Academy of Sciences at the request of President Wilson, to assist the Government in organizing the scientific

resources of the country for its needs at that time. After the War, by executive order of the President of the United States, the Council was perpetuated on a peace-time basis and now devotes its energies to the promotion and support of scientific research in general.

"The National Research Council embraces all fields of science and technology, including physics, mathematics, and astronomy; engineering and industrial research; chemistry and chemical technology; geology and geography; the medical sciences; biology, agriculture, anthropology, and psychology.

"The financial support of the administrative work of the Council is assured by a gift of \$5,000,000 to the National Academy of Sciences from the Carnegie Corporation of New York, about a quarter of which was devoted to the erection of a building in Washington for the joint use of the Council and the Academy. For the support of the special scientific projects set on foot or fostered by the Council, it relies on special gifts obtained from time to time from various sources.

"The Division of Engineering and Industrial Research, one of the divisions of the Council, aims to carry out the general purposes of the Council in the field of engineering and industrial research. Its major activities may be divided into two groups: first, promotion, aimed at the encouragement of research generally, and second, the administration of projects of national scope and importance."

### Camelot, Professor of Architectural Design

ROBERT CAMELOT, distinguished French architect and present holder of the Delano and Aldrich scholarship for French architectural scholars in America, is serving for the first term as visiting professor of design in the Department of Architecture at the Institute. Mr. Camelot is taking the place of Professor Jacques Carlu, who with Mr. Paul Cret of Philadelphia was appointed by the French government as architect for the building which France will erect at the forthcoming Chicago Exposition.

Professor Camelot is a graduate of l'École des Beaux Arts in Paris, and has had the honor of contending for the Grand Prix de Rome. The Delano and Aldrich scholarship, of which is he the fifth holder, was established by members of the New York architectural firm of that name on the occasion of their organization's 25th anniversary. The scholarship, whose purpose is to afford one French scholar annually an opportunity for travel in America, is administered by the committee on education of the American Institute of Architects, of which Professor William Emerson, Head of the Department of Architecture at Technology, is a member.

### High Scholastic Ratings Announced

THE Institute made public on October 1 the names of 472 students, who, during the second term of the school year 1930-31, maintained a high scholastic standing. The list, comprising the names of undergraduates only, did not include the Class of 1931. Students of the remaining three classes were divided into groups of first, second, and third rank, according to their scholastic achievements.

Students of the first rank constituted 3.8% of the class of 1934; 3.4% of the second year students, and 2.5% of the third. In the second rank were included 6.7% of the first year class; 6.2% of the second, and 8.9% of the third-year students. Ranking in the third scholastic group were 15.6% of the Class of 1934, 15.3% of the sophomores, and 16.2% of the junior class.

### A Corner Stone is Laid

THE corner stone of the new George Eastman Research Laboratories at Technology was laid by President Compton at a brief ceremony on the afternoon of October 16.

In the limestone block was imbedded a copper box containing a copy of President Compton's annual report to the Corporation, a copy of *The Review*, a pamphlet describing the graduate course in physics and chemistry, the seal of the Institute, photographs showing the building in various stages of construction, and copies of *The Tech* and Boston newspapers.

Also included were two glass tubes filled with carbon dioxide gas, containing sheepskin scrolls upon which were inscribed the signatures of members of the faculty of the Departments of Physics and Chemistry. The carbon dioxide gas was used to prevent oxidation of the ink. The common coins of the day, including a dollar bill, pieces of silver, and five copper coins were also deposited.

As the stone was lowered to its foundation, Dr. Compton said, "No words can more fittingly express the reason for this building and our hope for its future, than the following quotation from Pasteur: 'In our century science is the soul of the prosperity of nations and the living source of all progress.'"

"I have the honor, therefore, as representing all of those interested groups which are here represented, to express their belief in the importance of science and their faith in the part which this building and those who work therein will play in the future developments of science, by now laying the corner stone of the George Eastman Research Laboratories."

In the group which witnessed the exercises were the late Dr. Samuel W. Stratton, Chairman of the Corporation; Mr. Harry J. Carlson '92, of the firm of Coolidge and Carlson, the architects for the building; Mr. Charles T. Main '76 of Charles T. Main, Inc., advising engineers; representatives of Stone and Webster, Inc., the contractors; and members of the Faculty of the Departments of Physics and Chemistry.

### *The Successor to Mrs. King*

SHOULD a course in international anecdotes be established at Technology, Miss Amy P. Row, newcomer to the staff of Walker Memorial, might well be asked to take the chair. Hearing her relate, with the inimitable knack of the traveled Englishwoman, a few of her extraordinary experiences in odd corners of the world, ranging from bullfights and earthquakes to chats with cannibals and Mahatma Gandhi, leads one to believe that she will make many new friends in her duties at the Institute.

Miss Row comes to Technology to take up the work carried on for so long and with such great understanding by Mrs. Ellen A. King, known to generations of Institute students, whose friend and counselor she was, and to whom her retirement this year because of ill health

was a cause for keen regret. To the vacancy she left, Miss Row brings a cosmopolitan background and a remarkable breadth of experience.

As an American friend of Gandhi's hostess, Miss Muriel Lester, Miss Row was invited last summer to the famous settlement house, Kingsley Hall, founded by Miss Lester in one of the most poverty-stricken sections of East London. Here, in a small, partially glassed-in, shed-house on the roof, often overhung and obscured by smoke from the encroaching chimneys of tenements and factories, Miss Row was introduced to Gandhi. As she entered, he was sitting cross-legged on his mat talking animatedly with a Hindu friend. He greeted her with a simple gesture. Near the Mahatma was a large vase of flowers. Otherwise, the room was almost bare of furnishings, and guests squatted on the floor. During Miss Row's visit, interest centered around the Home for Indian Seamen, which was founded by her father near the British India docks in London and has long been a haven for Lascars and the "untouchables," India's most despised caste.

"Gandhi is a nice shade of mahogany," Miss Row said in describing the scene in Kingsley Hall, "though his heavy white khaddar robes and the cowl about his head left very little of him visible. No, he doesn't go about London in nothing by a loincloth; neither did he bring a goat with him from India! An English goat supplies his daily diet of milk."

In similar quarters sat Miss Slade, Gandhi's disciple, a picturesque figure in her flowing sari robes. She was busily engaged at her spinning wheel.

"She prepares all food eaten by the Mahatma," explained Miss Row, "washes his clothes, cleans his room, and arranges his bed. Her quiet dignity possesses one, as does her transparent nobleness of character."

His poorly clad East End neighbors took a remarkable interest in Gandhi's every move, according to Miss Row, and his comings and goings were important daily events. One keen Cockney observer noticed every evening upon the famous man's return to his quarters a small white object being hoisted to the roof. It turned out to be Mr. Gandhi's daily wash, one loincloth. From then on the event was greeted regularly with delighted cries through the crowded streets: "'E's 'ome!'"

Although many amusing stories are told of the Mahatma, Mr. Gandhi himself gives evidence of a keen sense of humor, declared Miss Row, at the same time impressing one with his firmness of opinion.

In the international scope of her activities, Miss Row is but carrying on the tradition of her typically British family. Her brother, Arthur, was one of the

hardy group that went with Scott and Shackleton on their Antarctic explorations. Her father, Captain John H. Row, was for 40 years engaged in the British India Service and in scientific and social work among the seafaring and fisher castes in India.

Born in Cornwall, England, and educated at Bella Vista College, Miss Row at the age of 23 left a position at the East London Children's Hospital to travel for five years through Norway, Belgium, South Africa, Australia, Tasmania, Canada, and New Zealand. At Whanganui and Whararata, New Zealand, she spent two years in missionary work among the Maoris, native tribes of the island, under the direction of the Reverend Fred H. Spencer of the British and Foreign Bible Society.

The Maoris, only a few score years removed from cannibalism, resemble Mexicans in color, according to Miss Row, and live on reservations very much like the American Indians. Some of them have amassed enormous wealth in semi-precious stones, land cultivation or sheep stations, and live in luxury, sometimes sending their children to be educated in English schools. On the other hand, brilliant tattooing is not uncommon among the Maoris, nor even the proud display of somebody's tooth sticking through the ear or nose of a village dandy.

A very old and wrinkled Maori chief once approached Miss Row, seized her hand, and gravely pronounced it "Kopai te pik," (a good bone to pick). Notwithstanding which, Miss Row still maintains that New Zealand is one of the world's loveliest and most progressive spots!

Since making her home in America, Miss Row's work in various religious, social, and educational capacities has taken her into many sections of the country. Her keen interest in foreign students and their problems led her to establish a small International House in Cambridge in 1924, and to head it for a year. The Chinese Flood Relief Committee, recently organized by students at the Institute, found Miss Row a valuable aid, as have half a dozen other welfare and educational organizations in Boston and Cambridge.

### *Miss Gerken Speaks on Health Education in Philippines*

MISS EDNA A. GERKEN, director of health education in the Philippine Islands, visited the Institute last month and spoke to the students in the Department of Biology and Public Health on various phases of her work there.

Miss Gerken received her training in the Department of Biology and Public Health at the Institute, graduating in the Class of 1926. She has been successfully engaged for some time in health education work in Manila.



# ADVERSARIA

## *Invented*

¶ By GODFREY L. CABOT '81, a mail pouch pick-up device for planes. The device is featured by a catapult arrangement, operating with shock absorber, rope, and winch, which shoots the mail bag forward at a speed of 70 miles an hour when the hook from the airplane first strikes a release cord before picking up the bag. This arrangement minimizes the shock to the plane in the pick-up. The pouch is fastened on a rope and suspended between two 20-foot uprights, 15 feet apart and mounted on a truck. Successful tests of this new invention have been conducted by Air Corps engineers at Wright Field. Mr. Cabot is a former President of the National Aeronautic Association.

## *Honored*

¶ RAYMOND M. HUGHES '98, by having a college building named for him. The following is quoted from the October number of the *Journal of Chemical Education*: "Miami honored one of her most distinguished living alumni when the board of trustees, with the recommendation of the president of the university, voted to name the newly finished chemistry building Hughes Hall. This is named for R. M. Hughes, Miami 1893, professor of chemistry 1898 to 1913, and President of Miami University 1913 to 1927. In 1927 he became President of Iowa State College.

"The alumni, friends, and faculty of Miami University are pleased to commemorate so distinguished a name as Hughes by so handsome a building. They believe that it is a fitting testimonial of their appreciation of R. M. Hughes as an alumnus, loyal friend, chemist, teacher of chemistry, and administrator."

¶ HOWARD J. C. MACDONALD '07, by receiving a prize of approximately \$7,500 from the Soviet Government for his work in the development of Russian metallurgy. A decree, made public by the Soviet Supreme Council, not only expressed the thanks of the Soviet Republics for the introduction of the American system of mining, but it rewarded Mr. MacDonald and announced that his methods would henceforth be employed in all enterprises dealing with non-ferrous metals and iron and steel.

"All enterprises dealing with black, or iron, steel and colored, or non-ferrous metallurgy," the decree said, "proposed hereafter to use the system of Engineer MacDonald, which has been in practice for three years in the Ural and Altai organizations on colored metals." The decree called attention to the fact that Mr. MacDonald's system had resulted in large economies.

Mr. MacDonald, who holds a high consultant position with the Soviet mine trusts, said: "I am naturally grateful for the honor, but, of course, the work for which it is bestowed would not have been possible without the coöperation of the Russian officials and workers with whom I am associated."

He is a pioneer among the American specialists who are taking an increasingly large part in Russia's industrial development and this is the fourth year he has spent there, chiefly engaged in planning the mines and metal work. Most of his first two years were spent in the Ural Mountains, but he is now stationed in Moscow. He is virtually in charge of all planning, administration, and exploitation of most of Russia's mines.

## *Predicted*

¶ By WILLIAM H. PICKERING '79, a giant unknown planet 44,000 miles in diameter. He has named it Planet P, and says that it is a member of the sun's family.

Dr. Pickering bases his forecast of the new unknown upon years of computations. He finds the evidence of the unknown planet in a perturbation of Uranus. This planet, Dr. Pickering says, is off its course and the deviation is accounted for by existence of an unknown element exerting a gravitational pull. He also finds additional evidence of Planet P in the actions of certain comets. His deductions are that the unknown is the third in size in the solar system, Jupiter and Saturn being larger. Its distance from the sun is estimated to vary between 5,000,000,000 and 9,000,000,000 miles, depending upon the planet's position in its elliptical orbit.

Only telescopes in the southern hemisphere could see Planet P in the present forecast position. If they are turned upon the right part of the sky, the planet is so big it will show a disc instead of a mere point of light.

## *Elected*

¶ GEORGE W. KITTREDGE '77, to an honorary membership in the American Society of Civil Engineers. Mr. Kittredge is a retired chief engineer of the New York Central Railroad and in this position he attained international distinction. He made three outstanding and lasting improvements in New York's transportation. One, the Castleton cut-off, to relieve the congested freight traffic in Albany; another, the Grand Central Terminal; and a third, the west side improvement. Mr. Kittredge, who is now a consulting engineer, has served on many committees and boards, serving the railroads in this country.

¶ ALBERT R. LOSH '14, to the manager-ship of Oklahoma City. Mr. Losh has had considerable experience with municipal, state, and government bureaus. Since 1929, he has been highway engineer for the state of Oklahoma and has been responsible for the carrying out of the extensive road building program.

¶ ROBERT E. WILSON '16, to a directorship in the Standard Oil Company of Indiana. Mr. Wilson is the inventor of a number of the new processes and products used or made by the company and is the author of more than 60 technical papers, most of which relate to problems of corrosion, lubrication, motor fuels, and cracking.

¶ HARRISON P. EDDY, JR., '17, to a Vice-Presidency of the American Society of Municipal Engineers.

## *Appointed*

¶ HAROLD W. BIBBER '20, to the faculty of the Ohio State University as Associate Professor of Electrical Engineering. For the last eight years he has been an engineer with the General Electric Company.

¶ JOSEPH C. TWINEM '30, state geologist in Maine. He is also a member of the faculty of the University of Maine.

## *In the News*

¶ RUSSELL W. PORTER '96, by having an account of his life story published in the *American Magazine*. It is entitled "One Really Happy Man." (Further details may be found in the class notes of '96.)

¶ According to the *Brooklyn Eagle*, "F. ALEXANDER MAGOUN '18 and ERIC F. HODGINS '22, co-authors of 'A History of Aircraft,' which was published by Whittlesey House on August 27, had the first draft of their book taken down on a stenotype machine. They estimated that more than three-quarters of a mile of stenotype tape was used to record their 480-page book. Mr. Magoun, who is a professor at Technology, planned to save this record of their work for posterity and left it with Mr. Hodgins in New York on the understanding that the tape would be boxed and forwarded to him when it had been transcribed. But he was doomed to disappointment. Post and Gatty had to be welcomed after their world flight. So Mr. Hodgins, ignoring all other plans for it, felt that the tape could enjoy no finer fate than to be thrown down on Post and Gatty, the last of the heroes to be included in the text—and that's what he did with it."

## *Presented*

¶ By FRANK P. MCKIBBEN '94, a paper on structural welding at the fall meeting in Boston of the American Welding Society.



¶ By JOSEPH W. BARKER '16, formerly on the Institute's staff in the Department of Electrical Engineering, a report to President Nicholas Murray Butler in which he declared that technical schools must meet problems caused by Soviet ideas. According to Mr. Barker, who is dean of the School of Engineering at Columbia, the tendency in engineering is shifting from an industrial emphasis to human problems, including unemployment, production control, and general economic stability. Future industrial leaders, who are today the students in the engineering schools, must be trained to appreciate that there are "greater problems to be solved than the merely technical ones," although a proper balance must be maintained as "only through technical progress will the means become available to attack the other problems."

### Written

¶ By EDWARD H. SMITH '13, an article entitled "Icebergs," which appeared in the September issue of the *American Magazine*.

¶ By ERNST A. GUILLEMIN '24, "Communication Networks," Vol. I, on the "Classical Theory of Lumped Constant Networks."

### Received

¶ By CALVIN W. RICE '90, an honorary award at the recent 75th anniversary meeting of the *Verein deutscher Ingenieure*, consisting of a silver plaque especially struck to commemorate the founding of the V.D.I. at Alexisbad in 1856. At the presentation ceremonies, which were held in the Gürzenich and at which General Director Dr. Karl Köttgen presided, over 2,000 people were present, including such notables as the Lord Mayor of Cologne; the Rectors of the Universities of Berlin, Bonn, and Cologne; Dr. Oskar von Miller, founder of the Deutsches Museum; and many foreign representatives of the leading engineering societies of the entire world.

The citation which accompanied the plaque bestowed upon Mr. Rice read: "At the annual meeting in Cologne, commemorating its 75th anniversary, the *Verein deutscher Ingenieure* has awarded to Calvin W. Rice, honorary doctor of engineering, its V.D.I. Medal, in grateful appreciation of his services to technical-scientific achievement, particularly in promoting the mutual international interests of the engineers of the entire world."

¶ LINN A. FORREST '28, an architectural fellowship for a ten-month tour of Europe. This was created by Ion Lewis '78, of Portland, Ore., for young men who are deserving students. Mr. Forrest is planning to pay particular attention to a study of the development of modern architecture in Sweden and Germany.

### Technology Triad

¶ It is interesting to note that BELVIN T. WILLISTON '77, WILLIAM H. WILLISTON '02, and BELVIN F. WILLISTON '31 represent three generations of Technology graduates. The Review will welcome any other names of Technology trilogies.

### Spoke

¶ KARL T. COMPTON, on October 5, in opening the convention of Motion Picture Engineers. Dr. Compton is of the opinion that Hollywood's artistic confusion is succumbing to the engineer's ardor for order. "On my recent visit to Hollywood," Dr. Compton said, "it was intimated to me that the appearance in the studios of the engineers now necessary to carry on the complicated technical process of synchronous sound and picture registration has already made its influence felt in bringing about more systematic handling of the complicated process of 'shooting' a picture."

### Deaths

¶ Reports have come to The Review since the last issue, of the decease of the following:

¶ HOWARD A. CARSON '69, on October 26, at his home in Malden, Mass. He was a past President of the Alumni Association and a Life Member of the Corporation.

From 1871 to 1877, Mr. Carson was assistant engineer of the Providence water works. He then came to Boston as a member of the city engineering department. The metropolitan sewage commission was created in 1889 and Mr. Carson was named chief engineer. He studied the drainage systems of London, Paris, and other European cities and then adapted the best ideas of what he had seen abroad to conditions existing here. He overcame serious difficulties in the building of the Tremont Street subway begun in 1894, and completed the task for some \$200,000 less than the estimates. Subsequently he engineered the East Boston and Washington Street subways. He was a member of the Institute of Civil Engineers of London, the American Society of Civil Engineers, and the Boston Society of Civil Engineers.

¶ HENRY A. MAGOUN '85, on October 25, at his home in Bath, Maine. Mr. Magoun was prominent in the shipbuilding business for many years. After graduation from Technology he was identified with various shipbuilding companies. He was Vice-President of the New York Shipbuilding Company and for two years served as President of the Atlantic Coast Shipbuilders, and as Vice-President of the Society of Naval Architects and Marine Engineers. He supervised the construction of several torpedo boats, dreadnaughts, and airplane carriers for the United States Navy.

¶ CHARLES E. BEALS '89, on October 5. He was a pastor of the East Taunton Congregational Church.

¶ WALTER S. CHASE '95, on October 11, at his home in Waban, Mass. He was widely known as a refrigeration expert, entering the service of the Quincy Cold Storage and Warehouse Company of Boston shortly after graduation, where he remained for over 35 years.

¶ HARRISON NESBIT '98, on October 21, as a result of an automobile accident. Mr. Nesbit was both a lawyer and banker. After admission to the bar, he practiced for nine years, then entered the banking field.

¶ ALEXANDER R. HOLLIDAY '99, on October 14, at Indianapolis. Until his death, Mr. Holliday was Secretary and Director of the Indianapolis Belt Railroad and Stockyards Company, a Director of the Fletcher Trust Company, and Secretary-Treasurer of the National Concrete Company, Indianapolis, a bridge-building firm.

For some time after graduation from the Institute, Mr. Holliday was employed as a maintenance engineer by the Pennsylvania Railroad. He withdrew from that work to enter the utilities business, becoming President of the Noblesville Heat, Light and Power Company and Secretary of the Kokomo Railway and Light Company. He held large blocks of stock in both companies, but sold his interests in these concerns about ten years ago to become associated with the National Concrete Company, the Belt Railroad, and the Fletcher Trust Company.

In the World War Mr. Holliday served as assistant fuel administrator of Indiana. In addition to his business activities he was active in the work of the Family Welfare Society as a director of the organization.

¶ WALDO C. YORK '09, affiliated with '08, on July 8, at his summer home in Cotuit, Mass. He was employed by the New England Power Engineering and Service Corporation until his death. (A detailed account of his life will be found in the '09 class notes of this issue.)

¶ JOHN J. DEVLIN '11, on October 12, at his home in Larchmont, N. Y. Major Devlin was a prominent New York engineer. When the war broke out he was a reserve officer of the army and went overseas as a captain of the 301st Engineers, 76th Division. Soon after his arrival in France he distinguished himself and was promoted to the rank of major.

¶ CLAUDE F. CAIRNS '13, on June 14. He was for 10 years President of the Acme Apparatus Company, manufacturers of radio and allied equipment in Cambridge.

¶ GEORGE C. LAMMERT '27, on October 25, at Oak Park, Ill. He was a mechanical engineer and was associated with his father in the engraving and engineering business of Lammert and Mann.

# NEWS FROM THE CLASSES AND CLUBS

1868

As Secretary of the Class of '68, I have had an up and down summer. My troubles began after some overwork that I did last winter. I had an attack of the flu which came on in February or March and I was in bed with it over a month and very slowly and gradually recovered. By August I felt quite like myself again. On September 14, I had a bad fall which injured my back and have been recovering from that ever since, but I am now practically over that.

Of my other two classmates, Joseph W. Revere and Daniel Merrick Wheeler, I will say that Joe has had some sickness and his doctor restricts his out-door efforts considerably, much to his disappointment. He went up to the Margaree River in Cape Breton fishing and caught two salmon. In regard to Wheeler, the letters I have received from him indicate that he is in the best of health and carrying on his professional work in spite of his age, which must be considerably beyond the usual limit. — ROBERT H. RICHARDS, *Secretary*, 32 Eliot Street, Jamaica Plain, Mass.

1875

Again the time limit is being crowded to get these notes in under the wire. By the instructions of the editors of *The Review* they should have been in Cambridge two days ago. I am waiting at Hotel Taft, New Haven, under pressure, on the last round of my travels. My summer tourist ticket, which has taken me to the North Pacific Coast, dies in Boston on October 31, when I am booked to arrive late that day. Since my former bulletin for *The Review*, which was written in Denver, I have visited in Cincinnati, Asheville, N. C., Nashville, Tenn., Washington, D. C., and New York and have been on a continuous go. Next week I am to report to President Hibbard and count on arranging to have the next class dinner at the Engineers Club, Boston, soon after the New Year.

Classmate William H. Bush, who went on the retired roster in the spring, has moved from St. Louis to Orlando, Fla., his new home address. His son, who has a position in the Treasury Department at Washington, in the office of the supervising architect, tells me that he is to visit him soon when we are to have a get-together, I'm glad to say.

This morning I have made good a standing promise and called on Frank H. Pierce, 1275 Chapel Street, New Haven. As he puts it, his days for climbing stairs are of the past. We exchanged compliments on the health of the other. On September 28, 27 friends assembled at his home to celebrate his 80th birthday, a happy occasion. — HENRY L. J. WARREN, *Secretary*, 4700 Langdrum Lane, Chevy Chase, Md.

1877

The following letter was received from Arthur L. Plimpton: "There is no mention of Plimpton in the notes about '77 in the October *Technology Review* and here is the reason. In the month of June I was feeling very miserable, and about the first of July I was taken to the hospital for an operation on the prostate gland. I was there for a month and was in a very weak condition all of August. I am now gaining slowly, and go back to my office a little while about three times a week.

"I undoubtedly received a notice of the Class Reunion, but have no recollection of it. I certainly hope to be at the next gathering of the Class. Please give my regards to Mr. Clark when you are in touch with him, and explain why there was no word from Plimpton last June."

Our classmate, Frederic R. Newbold, died at his summer home in Beverly Farms, Mass., on Tuesday, June 30, at the age of 77. Mr. Newbold was largely responsible for the organization of the Horticultural Society of New York some 30 years ago, when there was no horticultural organization serving the interests of the well-to-do amateur gardener. He and a group of men founded the Society in 1900. The Society was incorporated in 1902.

During the war he was one of the moving spirits of the American Fund for French Wounded. About this time he also interested the American Red Cross in taking over the tea room at the International Flower Show in New York, and to further assist the Red Cross funds, arranged for one orchid bloom to be auctioned off at the flower show, \$1,000 being realized for it.

Mr. Newbold was a member of nearly every horticultural organization in the country and of the Knickerbocker Club, and of Grace Church in New York City. He was highly esteemed by all with whom he came in contact. He was not in the least commercial, he had no axe to grind, and he asked nothing for himself. — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1882

Richard Howland Hunt, F.A.I.A., distinguished New York architect and former President of the Municipal Art Society, of which he was a member for many years, died at his home in New York City on July 12 last, after a month's illness. He was in his 70th year. He was the son of the late Richard Morris Hunt, famous architect and nephew of William Morris Hunt, noted artist. His father, who died in 1895, was one of the great influences in American architecture. His studio in New York was a nursery of architects, the first of American training schools for the profession. The son, who was born in Paris on March 14, 1862, in-

herited the tastes of his father and, after a special two years' course in architecture at Technology, Class of '82, entered the École des Beaux Arts in Paris, where his father had been the first of a long line of American students.

On his return to this country, he became associated with his father and later was for years head of the firm of Hunt and Hunt, of which his younger brother, the late Joseph H. Hunt, was a partner. In recent years Hunt had not been engaged in general practice, confining himself to consultations. Among his works may be mentioned his completion of one of the new wings of the Metropolitan Museum of Art from a small sketch left by his father. He designed Quintard Hall and Hoffman Hall of Sewanee University, Kissam Hall at Vanderbilt University, and the country homes "Idle Hour" for the late W. K. Vanderbilt, "Castle Gould" for Howard Gould, and "Gray Towers" for Mrs. O. H. P. Belmont.

On many occasions Hunt had advocated measures he believed conducive to the beautifying of New York City. As chairman of the committee on city plans of the Merchants' Association, he urged many improvements in Central Park, and with other members of the city plan committee of the Municipal Art Society, he protested in 1926 against the unrestrained development of the skyscraper as a formidable obstacle to the orderly and beautiful growth of the city.

Hunt was a former President of the Architectural League of New York and of the New York Chapter of the American Institute of Architects. He belonged to the Beaux Arts Society, American Federation of Art, New York Society of Architects, Society of Colonial Wars, Society of Mayflower Descendants, and the Players and Century Clubs. — ALFRED L. DARROW, *Secretary*, 13 Garrison Road, Brookline, Mass. RACHEL P. SNOW, *Assistant Secretary*, Box 625, Falmouth, Mass.

1883

From the Portland (Maine) *News* we have an account of S. S. Gannett, who was with the civil engineers for a while before leaving the Institute. He now heads the computing section of the topographic branch of the Interior Department in Washington, and has held the job for the last 50 years. The clipping reads: "Even the stars in the sky are called upon for help in making better maps of America for Uncle Sam. To determine the exact latitude and longitude of various points in the United States for the purpose of making more accurate maps, S. S. Gannett, a native of Maine and chief of the computing section of the topographic branch of the Interior Department, employs astronomical observations.



1883 Continued

"From the stars he is able to determine the exact time at a precise instant in various localities. The difference in time between two points reveals in turn their relative position on the earth and makes possible the drafting of a true picture of any given portion of the globe. Fortunes and homes are sometimes dependent on the findings of the map makers. This often occurs when there is a boundary dispute between states, bringing the title of the property along the border into question. Then the ownership of farms and homes may be involved, or, sometimes, even oil wells and strategic trade centers are at stake.

"Besides his regular job as computing chief for the topographic division, Gannett is a boundary commissioner for the Supreme Court of the United States with the responsibility of locating disputed boundaries between states. In his latest job, which was to run, locate, and mark the boundary between New Mexico and Texas, in accordance with a Supreme Court decree, Gannett had among other things to find the exact channel of the shifting Rio Grande as it was 50 years ago!

"With problems such as these to cope with, it is natural that Gannett should have compiled a whole book of mathematical formulae for the aid of surveyors and geographers or that he should have developed formulas of his own to make the task easier. He has been nearly half a century at the job, entering the Interior Department in 1882, after he completed his studies in civil engineering at Technology. Even prior to that, while still in college, he had done surveying work for the government during summer vacations and helped mark a boat channel across the state of Connecticut.

"Gannett was born in Augusta, Maine, and went to high school at Bath. He first attended college at Bowdoin, later transferring to the Institute. After finishing school, he entered the topographical division of the Interior Department because of his liking for mathematics and the rapidly expanding topographical division offered good opportunities for a successful career.

"He is married to a former Maine girl, Ella Cole, of Houlton, and has three children. One son, Malcolm Gannett, is a patent attorney in Pennsylvania. The other son, Clarence, works in New York, while a married daughter, Mrs. Birdseye, lives in Massachusetts." — DAVID WES-SON, *Secretary*, 111 South Mountain Avenue, Montclair, N. J.

#### 1886

James T. Ball, *Secretary* of the Class of '86 of the School of Mechanic Arts, sent in an account of their reunion. This class from that school (which has been discontinued for many years) has always been very loyal to all Technology traditions and contains a number of men who have been, and still are, very active in industrial and business life.

The account, which was in the Clinton (Mass.) *Daily Item*, reads as follows: "On the evening of June 17, Bunker Hill

Day, the Class of '86, School of Mechanic Arts of Technology, banqueted at the Parker House in celebration of their Forty-Fifth Anniversary. Hiram Percy Maxim was chosen perpetual toastmaster and given an illuminated commission bearing the signatures of all members and professors present. The class has held reunions each five years since graduation and has held together remarkably with always a large percentage of enthusiastic members attending the reunions.

"On Thursday, June 18, the members and their families journeyed to Harvard and Still River, making 'Rosemary Cottage,' the summer home of Mr. and Mrs. James T. Ball, their headquarters for the day of sports, speeches, songs, and feasting.

"Among those present, accompanied by their ladies, were H. P. Benson, Salem's popular ex-Mayor and President of the Naumkeag Mills; Hiram Percy Maxim of Hartford, noted inventor of many outstanding silencing devices, President of the Amateur Radio Association and of Hartford's flying field commission; W. F. Dawson, turbine department, General Electric Works, Lynn; F. C. Goddard, shoe manufacturer, Hotel Lenox; J. W. Killinger, mining engineer, San Francisco; J. G. Langdon, landscape architect, Olmstead Bros., Brookline; W. P. Richardson, architect, Salem; W. P. Turner, Professor, Purdue University, Lafayette, Ind.; Ambrose Walker, architect, Salem; N. S. Wooldridge, Equitable Life Assurance Company, Pittsburgh, Pa.; F. A. Whitney, manufacturer, Leominster, Mass.; Major F. S. Wilson, Marlborough Street, Boston, and others.

"Always the Class is honored by an attendance of their old-time professors, and the guests on this occasion were: Professors James R. Lambirth and James R. Smith, still at Technology after more than 45 years of active service, and Professor Clarence W. Fearing of South Weymouth, retired. Professor Lambirth, affectionately called 'Pa' Lambirth by thousands of Technology men, was adopted by the Class 'way back. He always comes to the reunions with his helpmate, 'the prettiest girl in Salem,' as he always refers to her, and sings the great old English song 'The Barley-mow' as no other ever has or ever will. Immediately the reunion was over, plans were started for the Fiftieth." — ARTHUR G. ROB-BINS, *Secretary*, Room 1-270, M. I. T., Cambridge, Mass.

#### 1887

Walter S. Moody retired from active duty on July 1, after 43 years in the service of the General Electric Company, more than half of which was spent in charge of transformer design at the Pittsfield works of the company. In recognition of his long service Mr. Moody was given a mahogany desk and chair by his associates in the power transformer engineering department, F. W. Peek, Jr., making the formal presentation. A metal plate bearing the following inscription is attached to the desk: "Presented to Walter S.

Moody after 43 years' service in the General Electric Company, by his associates and friends, July, 1931."

A native of Chelsea, where he was born September 20, 1864, Mr. Moody was graduated as an electrical engineer in the first class in that subject at the Institute in 1887. He remained a year as instructor of physics and electrical engineering, and then became an assistant engineer with the old Thomson Electric Welding Company at Lynn, a position which he held until 1892, when he became designing engineer with the General Electric Company and later chief engineer of the transformer department. In 1897 he went to Schenectady, remaining there until 1908 when he came to Pittsfield, where he remained until his retirement.

Many commercial designs of transformers now in common use originated with Mr. Moody and he is also the inventor of the induction regulator, as well as the author of many papers published by the American Institute of Electrical Engineers and publications of the General Electric Company.

He is a fellow of the A. I. E. E., member of the National Electric Lighting Association, the Electro-Chemical Society, the Mohawk Club at Schenectady, the Park and Country Clubs of Pittsfield, and the Congregational Church.

George Otis Draper, our genial Class Treasurer, writes from Riverton, Wyo., that he is on his seventh trip across the continent by auto, driving himself all the way. George stopped in Chicago and saw Sturges and Schmidt; also the start of the World's Fair for 1933. Evidently, Chicago is less "wild and woolly" than on the occasion of his last visit, as no mention is made of any bombings or gun play such as was noted at that time. — EDWARD G. THOMAS, *Secretary*, 1940 Calumet Avenue, Toledo, Ohio. NATHANIEL T. VERY, *Assistant Secretary*, 66 Orne Street, Salem, Mass.

#### 1889

Reverend Charles E. Beals died very suddenly of heart trouble on October 5. He was pastor of the East Taunton Congregational Church. His daughter writes that he was able to carry on up to the day of his passing. The last day of his life he interviewed his congressman concerning the conference on disarmament in Geneva in 1932, and he spoke on "Changing our Industrial System" at the Taunton Kiwanis Club on Wednesday. The same evening he addressed a group in a neighboring community on "Religious Education."

Arthur Davis has changed his address to the Frick Building, Pittsburgh, Pa. — Another honor has come to '89. Frank A. Smythe, member of the Supreme Council, Elyria, Ohio, has been elected an active member of the Supreme Council for the North Masonic Jurisdiction of the United States. His election increases the total number of actives to 45. Under the Masonic laws, the active membership is limited to 66 men who hold their positions for life. — WALTER H. KILHAM, *Secretary*, 9 Park Street, Boston, Mass.



## 1891

The Hotel Expert Service Corporation has been organized, and the following account is from a newspaper clipping of last June: "Announcement is made of the organization by several leaders in the march of progress made in recent years by the American Hotel industry of the Hotel Expert Service Corporation, to serve the industry in planning, organizing, and operating hotels and other housing activities. The names of the officers of the new organization at once establishes confidence, both in the stability of the concern and the efficiency with which it may be expected to be conducted."

J. Linfield Damon is Vice-President. He was formerly Vice-President and Secretary of United Hotels Company of America, in charge of design, construction, and equipment, President of American Hotels Corporation, and supervisor of their plan of development.

The Committee on Class Book held a meeting at Cohasset on October 24 at Barney Capen's and a picnic lunch was served. Dana, Forbes, Hatch and Fiske attended. Barney was in his usual happy mood and it was a most enjoyable occasion. Most of the copy is ready for the press and we should have the book ready for distribution by the first of the year.

George Hooper writes that he has been kicked out of the City Engineer's Office (Pasadena, Calif.) for political reasons. "The people support me, but there is nothing to be done about it short of a recall of the Directors. This action has been started, but such things rarely succeed, and I have indicated that I would not again take the position if reappointed. Two years of 'mopping up' after a city engineer who is in jail and a city engineer who, but for the statute of limitations, would be there also, have given me enough of working for the public.

"My partner and I, years ago, made a formal resolution that our Company would take no municipal work. It was a wise decision and I should have stuck to it. Pasadena, however, seemed different and was different with the first Board of Directors under which I worked. That condition, however, was too good to last and I am paying the penalty for departing from my original judgment. I shall do now what I came to California to do — enjoy the society of my family and travel.

"My son is continuing his work at California Institute of Technology for an advanced degree in industrial chemistry and my youngest daughter will continue her art and music studies. We leave here tomorrow for our home in Pasadena and hope for comfortable weather. The 'unusual' climate of Southern California has given us the most uncomfortable summer within my recollection, even in this beautiful place which is ordinarily so agreeable." He sends remembrances to the crowd, any of whom he will be happy to see should they reach Pasadena on their travels.

Charlie and Mrs. Garrison have returned from the Pacific Coast by motor as usual, one day making 410 miles, just a nice little run across country for Charlie. — Barney reports a number of his friends who have been to see him recently, including Ralph Colburn and his daughter, Ernest and Mrs. Tappan, Edward and Mrs. Earl, George and Mrs. Holmes, and Harrison and Mrs. Cole.

A letter from President Compton to Barney mentions the great usefulness of the new Tech Loan Fund in helping students to continue their work who would otherwise have to drop out. He sent his best wishes to the Class. — Will Lawrence spent his summer at North Conway. He is very busy with his regular work and with the Lowell Institute courses.

George Hooper writes that Will Richardson is now living in Santa Cruz and that Will's health has improved, due to the change to a more northerly climate. — Jim Swan is now living at the Essex House, 160 Central Park South. He has written a short history of the Society of Naval Architects and Marine Engineers. — Charlie Aiken is in Lorraine, Ohio, for the time being. — HENRY A. FISKE, *Secretary*, Grinnell Company, 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, *Assistant Secretary*, The Early Convalescent Home, Cohasset, Mass.

## 1895

Summer has come and gone, and it is hoped that all have benefited and prepared to press forward, each in his own way, to solve some of the interesting problems of this glorious civilization. The note of pessimism is too rampant and it behooves the men of '95 to step into the breach and clean the atmosphere. Many of us are still in the game, and we may well believe that we can accomplish almost anything if we try very hard. We may not all have the same amount of brains, but we do have the spirit, and let us keep together through a word or two in these columns. Ninety-five to the fore! Just a word to your secretaries, and the result will be to stimulate the universal optimistic smile of a '95 man.

One by one, "we follow in His train." Walter S. Chase passed away on Sunday, October 11, at his home 30 Gammons Road, Waban, Mass. Chase had not been well for some time, having relinquished his life work last June. Walter was widely known as a refrigeration expert, entering the service of the Quincy Cold Storage and Warehouse Company, of Boston, shortly after his graduation, and remaining with them for over 35 years. Chase was 61 years old, a member of the Odd Fellows, the Fruit and Produce Exchange, the Marketmen Relief Association, and an ardent '95 man. His wife, Mrs. Cora Chase, and two sons survive him. Let taps be sounded! — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, Graybar Building, New York, N. Y.

## 1896

Apparently the request of The Review Editors that a modicum of class news be the rule for this issue must have in some unaccountable way gone forth as a telepathic wave communication, so that no classmate has reported any item of real news. The Secretary has received two letters, it is true, but neither was of much assistance from a news viewpoint. Woodwell wrote from New York expressing condolences on the loss of Dr. Stratton, and he reported that John Tilley was still working and apparently had fully recovered from his gastronomic excesses at the reunion in June. Charlie Hyde wrote briefly from California to report that he was looking forward to seeing Dr. Tryon there and getting through him the latest Technology news, but Charlie failed to give any details of the wonderful trip which he and Mrs. Hyde had to Japan, beyond reporting that he arrived back safely and had gone to work again.

W. L. Root's son made contact with the Secretary on his arrival as a freshman, but this event cannot be expanded very much. Henry Jackson has made frequent calls to report progress in the preparation of the moving pictures which were taken at the reunion.

The foregoing looks like pretty thin reading, and the Secretary was about in despair when fortunately the *American Magazine* came to the rescue. Perhaps some classmates may have read the November issue containing an account of our classmate, Russell Porter, under the caption of "One Really Happy Man," containing a splendid speaking likeness of the subject. Porter is designated as "an Arctic explorer, an architect, a composer, and an artist." His life story is told in the most interesting way, including his various trips to the Arctic during the period when his roving nature predominated, followed by the second more settled period of his life, when he became associated with Hartness in the Jones and Lamson machine plant in his native place of Springfield, Vt. It was on this job that Hartness christened him the Leonardo da Vinci of the establishment. The story of Porter's work with lenses and mirrors, and particularly his development of the Springfield Telescope Club, which has now spread to other parts of the country, is told in detail, together with the final culmination in a call to Pasadena to take charge of the job of the design and construction of the mounting for the new reflecting telescope, the mirror of which is to have twice the diameter and four times the light-gathering power of the biggest existing telescope. He now carries the title of "Associate in Optics and Instrumental Design" and is in his element with such scientists as Millikan, Hale, Anderson, Hubble, and Humason.

In his own words: "When I studied architecture I learned how to design 40-room villas, but what I really designed in practice were three-room cottages. I went from the sublime to the ridiculous. My first telescope was a two-inch; now I'm working on the 200-inch, so I've

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gone from the ridiculous to the sublime." It is believed that readers of this article will agree that while Porter has not had the spectacular publicity accorded to Mr. Edison, nevertheless he reminds one in a number of ways of the great inventor. He is about the same size, he is a little hard of hearing, he has the same kindly smile; but above all he has shown that tremendous painstaking care in whatever job he undertook, so that he has been able to turn out wonderful results. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

## 1899

It is with regret that I must announce the death of Alexander Holliday on October 14 at the Robert W. Long Hospital, Indianapolis, Ind. Holliday had been seriously ill for about four weeks, but up to that time had carried on as usual his various business and community activities. He was associated with several literary and dramatic societies and was a gifted conversationalist, and those of us who saw him on his infrequent visits realized that Alex was the "salt of the earth." He was extremely interested in ancient art, and his zeal for pioneering combined to arouse his curiosity about the buried civilizations of Egypt to such an extent that his studies and investigations raised him to the position of an authority on the subject. He made several visits to Egypt, gathering information and exhibits for the museum at Indianapolis. Notice of Holliday's death has been received from several sources, and W. W. BONNS, the only other member of '99 in Indianapolis, has written that though he saw Alex only occasionally, he now feels a special sense of isolation. — W. MALCOLM CORSE, *Secretary*, 810 18th Street, N. W., Washington, D. C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

## 1900

There seems to be a startling lack of material this month from which to prepare any notes for this Class. Will the good old-time contributors please send in a word or two so that the Class as a whole may be kept informed of any news?

In a recent issue, the Wisconsin State *Journal* published a very interesting article about the century-old Indian Agency House near Portage, Wis. The house, which was formerly the charming old dwelling of John Kinzie, Government Agent among the Indians, has been restored and converted into an attractive tea room by Architect Frank M. Riley of Madison, Wis. Riley was in Course IV. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

## 1901

Word reaches me that Ralph Whitman, who entered the Navy shortly after graduation and who has remained consistently therein ever since, has just been promoted from Commander to the rank of Captain. He is stationed at the Mare

Island Navy Yard in California. Another Californian, one by adoption, of whom I had occasion to speak in these notes last year, is Carl Johnson, who is living, at least at odd intervals and seasons, on Route 2, Pasadena, Calif. As I think I have noted previously, Carl came to Boston in his own plane last year and I had the pleasure of a long foregathering with him. He has retired from active business and is engaging now in a public service which is extremely interesting and stimulating. I think, perhaps, I can best tell you what Carl is doing in his own words.

"Present Occupation in detail: Quite a lofty occupation — Aviation. — President of the California Conservationists, an organization which has for its purpose the conservation of California's natural resources and principally the fish and game. It is largely political in character, so the bulk of my efforts are spent with the State Officials and Legislature at the Capital in Sacramento. The work of organizing chapters carries me to all parts of the State, which, of course, I reach by airplane which I pilot myself. In the same manner, I make a semiannual visit to the 30 branch offices of my Company throughout the United States. We are manufacturers of Automatic Temperature Control devices. While I have retired from active routine service with my Company, and undoubtedly am not cutting a very wide swath in commercial affairs, nevertheless I am not sitting in a rocking chair, smoking an old pipe, and listening to my arteries growing hard, as our genial secretary strongly suspects. Instead, I listen to the roar of the Wasp 425 H.P. on the nose of my six-place, cabin monoplane and look down upon a new world, more beautiful than I ever imagined it could be. By way of encouragement to fellow classmates who may vaguely have considered learning to fly but think they might be too old, let me say that I now am 53 years of age and have been flying steadily for three years under all conditions of weather and over the entire country. I can truthfully say that I feel 15 years younger by reason of that youthful confidence attained in handling the controls of my ship and the mastery of the most wonderful medium for rapid and safe transportation creation has given us, the air. The hardest part of the whole affair is dragging yourself before an instructor at the airport and, in the face of the uncanny winged monsters with their roaring motors, getting rid of those fatal six words that stick in your throat, I want to learn to fly. You will be so surprised at yourself that you will nearly fall over, but the lump in your throat is gone and Timidity, who has been hanging to your coat tails, has disappeared around the corner. A glorified sense of ease and freedom follows the first handling of the joy stick, and when you taxi up to the line after your solo flight, you would not trade places with the King of England."

It is certainly a gay life and a merry one. I hope the next time that Carl comes East he will give me a ride in his little

boat, as there are several parts of New England that I should like to see from the air.

A short time ago the Strawberry King, of whom more anon, wrote me that he had made a visit to Canada and, in the course of his various professional pursuits, had chanced upon a classmate with whom he and all of us in this part of the world, at least, had long since lost touch. The classmate in question is B. F. Haanel, and he is the Director of the Division of Fuels and Fuel Testing in the Department of Mines for the Provincial Government. His headquarters are in Ottawa. Haanel was originally a Syracuse man, but after graduating and doing some post-graduate work there, he came to M. I. T. for special studies. His work progressed so well that he ultimately matriculated in the Class of '01 and secured his degree with that Class, an early indication of wisdom. His work is primarily in the conduct of investigations in fuels and fuel research. Several M. I. T. men are with him, so he writes, but they are of a younger vintage than are we. Haanel does not say anything about an airplane, but I hope very much that he will swing down to Boston in some less inspiring means of transportation some time in the not far-distant future and give us a chance to catch up on the happenings of the last 30 years. It may be of interest to the faithful to know that he has pledged himself to attend our Thirty-Second Reunion, which I may mention in passing will take place two years from last June and in the same delectable spot in which the Thirtieth Reunion was spent, namely, Oyster Harbors.

Reverting for a moment to the Strawberry King, I am not sure that I have given notice through these columns that he has become President of the Seaboard Public Service Company and its subsidiaries and has moved his headquarters and offices from Charlottesville to Alexandria, Va. Al still retains possession of the baronial estate in Maine and repairs thither from time to time, I presume to inspect the strawberry crop and count the berries. He came through Boston a short time ago, but to my great regret I missed him. I hear from him, however, from time to time as I know other members of the Class do as well. With all his varied interests he does a great deal of traveling and I know from reports which have come to me from others of the Class that he is assiduous in keeping in touch with many old friends. I wish that a large number of you would take a leaf out of his book and establish the same general program. I speak feelingly and personally so far as your Boston contacts are concerned.

It is my sad duty to report the passing of another member of the Class, Dr. Erik H. Green, in Providence, R. I. Erik died April 5 of the current year, but word reached me only a short time ago and that through the courtesy of Mrs. Green. I shall hope to have additional details to transmit to the Class in a later letter. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.



## 1903

Various appointments, elections, and honors have been coming to members of the Class. Joyce was elected Vice-President of the Worcester County Alumni Association; Garcelon has been appointed manager of the control engineering department of Westinghouse Electric and Manufacturing Company at East Pittsburgh, Pa.; Myron Clark has been elected Vice-President in charge of operations of Reading Iron Company; and Lenth has been nominated a member of the executive committee of the American Society for Testing Materials.

Hood received the degree of Master of Arts at Brown in June. Dr. Clarence A. Barbour, President of Brown University, said in awarding him the degree: "Graduate of the Massachusetts Institute of Technology in 1903, notably successful in the vocation of architecture, coming into wide public attention as winner of the international contest for the design of the Tribune Tower Building in Chicago in 1922, since then an outstanding figure by reason of his many artistic achievements, notably the design and construction of the National Radiator Company Building in the City of New York, now associated in the planning and constructing of the world's greatest radio center — steadily winning his way to the summit of his useful calling." He is one of the eight consultant architects for the World's Fair in Chicago in 1933.

F. B. Jewett's work as President of the Bell Telephone Laboratories, Inc., receives appreciative comment in the May *Outlook and Independent*. The article says that Dr. Jewett has led the way to such breath-taking wizardries as permalloy — magnetic metal which speeds up the transmission of messages by submarine cable — long distance telephone, and the latest miracle of television. Jewett is also chairman of the Committee of Award for the Popular Science \$10,000 annual award for notable scientific achievement. Many notable men in the scientific world are members of this committee, Dr. Compton being one of them. — FREDERIC A. EUSTIS, Secretary, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, Assistant Secretary, 89 Broad Street, Boston, Mass.

## 1905

Dan Harrington writes: "If you see Bob Folsom some time soon, tell him that I have lost considerable confidence in him. I went to the horse races down at Havre de Grace and found there a horse named 'Bobby Folsom.' It was a long shot but, under the circumstances, I felt I had to bet on him as I had implicit confidence in Bob's being able to come through. The result was utter failure — 'Bobby' was one of the 'also-rans.' The conclusion I reached was that this horse was named for another Bob Folsom."

Bill Keen says: "I was at the reunion in Boston and Swampscott last year and was very sorry to find that you had returned before the finish of things and I just missed seeing you. I did see a lot of

old friends, however, and had a good time. I am with the Latrobe Electric Steel Company, at their New York office, and live at the Engineers Club when in New York, which is approximately half the time. Wentworth blows in occasionally and Landers is a frequent visitor. I have also recently seen Motter and Roy Allen and, a short time ago, Barrier. So far, I have only had a chance to go to one of the Seminars at the Technology Club, but had a good time at that one and enjoyed seeing Doc Lewis again. He sure has a line that is interesting when it comes to making a speech."

After his long silence, we were gratified to hear from Bill Ammen, Land Title Building, Philadelphia. He says: "I very rarely hear anything of XIII-'05, though I see Anderson on the train here about once in a year. Since he gave it up, our Technology Alumni organization here seems rather moribund. I saw Gunn, Blakeman, and another here just after the war, but not since. Are there any more XIII men around Philadelphia, Baltimore, or Washington, which is the extent of my ordinary orbit? Do you remember the XIII-'05 photo you took in the old Naval Architecture drafting room? I still have it, somewhere. (We have it and we know where it is, Secretary '05.) Landers, II, is prospering as a patent lawyer (like me) in New York, and I see him in Washington sometimes."

And Maurice Landers writes: "I have made a change in my business connections. A little over a year ago, I left Fish, Richardson and Neave to develop my own independent patent practice as a member of the firm of Hammond and Littell, 475 Fifth Avenue, New York. I am finding it very interesting. Today, I am working on a \$10,000 automatic, five-variable range angle calculating mechanism that operates under control of the sighting telescope. It has been built and operates well within the predetermined permissible limits of deviation. It grieves me that I cannot show it to Getty Lanza. It would bring to his face that smile of satisfaction that he gave George Jones when George made a perfect recitation on the theory of elasticity."

Here is the second section of Jack Flynn's story: "My people furnished the contractor for the great Dry Dock at Seletor Naval Base with steel bins, batchers, and foundators for handling and measuring the stone and sand for the 1,000,000 cubic yards of concrete that will go into this project of the British Government. Grave difficulty developed with the sand-handling equipment, as the contractor had piped his sand pump directly into the measuring bins with no provision for dewatering the pumped slurry. Many clever stunts for eliminating the surplus water (it amounted in volume to four or five times the volume of sand) were thought up, but time passed and the trouble was solved by pumping into a great trough in front of bins, allowing water to leak out and then claim-shelling the sand into bins. Now all goes merrily as a wedding bell and great is the joy that rules in that land.

"A jolly journey through sweet Java, where I found the Dutch doing a good job for the 50,000,000 Javanese, Malays, Chinese, and criss-crosses and *singas* that inhabit that isle. I was enormously impressed with Dutch engineering ability as expressed in road building, fort works, city building, hydro-electric development, and particularly in radio-transmission (telephone, short-wave telegraphy, and sending of pictures, sketches, Chinese and Arabic scrip, and so on)." (To be continued.)

Ben Lindsley wrote in September from Denver: "I have been away from Bartlesville, Okla., since August 10, fishing in Ottertail Lake, Minn., and since that time we, the four of us, have been taking in the Yellowstone and some of the other wonders of the Rockies." — After furnishing George Wald's address, Paul Paine surprised your Secretary with some avocado pears, a rare delicacy to which some of us are unaccustomed. Peachem's thoughtfulness was much appreciated. — Fred Goldthwait, long a resident of Melrose, has moved. The announcement reads "We raised the roof, but it didn't relieve the congestion, so we're moving to 35 Park Avenue, Wakefield, Mass." Your Secretary had a pleasant visit with Fred at Center Harbor, N. H., where both families were spending the summer.

A letter from Ralph Whitcomb, dated London, 29 July, locates him for the minute and promises "to write some kind of account of my past two years, even if I do it piecemeal." Good. — Arthur Abbott has moved his office from Boston to Winchester National Bank Building, Winchester, Mass. — Elliott Lum, who was manager of the Columbus, Ohio, office of the Graybar Electric Company, is now running their Providence, R. I., office. — Bertrand Johnson was married on August 17 to Miss Marion Louise Humber of Washington, D. C. — Bob Morse is senior member of Watson, Coit, Morse and Grindle, Attorneys at Law and Counselors in Patent Causes, 916 G Street, Washington. — Jim Barnes has been to Europe and returned. — Dan Adams closed the Chicago office of Lockwood Greene Engineers, Inc., in July and is with the same firm in New York, 100 East 42d Street. He took a vacation on Nantucket "to try to wash the Middle West out of my soul with salt water" as he said. He's a granddaddy, too.

Some time ago, your Secretary walked into the South Station, Boston, and was dumbfounded. Everything in sight was new and gone was the smell. For an instant he wondered whether he might be in George Funk's new and magnificent North Station by mistake. The train shed is down, in fact there's nothing left but the waiting room where you can still meet your friend in any county in Massachusetts. — Bertrand Johnson is the author of *Phosphate Rock* in 1929, being a part of *Mineral Resources of the United States*, 1929, published by the Bureau of Mines. — Ros Davis, Assistant Treasurer of Wesleyan University, was recently appointed to the board of directors of the Connecticut State Hospital at Middle-



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town by Governor Cross. — John Glidden writes from Peru: "I find myself well and hopeful for the future but not so well situated in a material sense." — Ed Lorenz writes that he hasn't "changed firm or title in ten years, though there is steadily more responsible work and more of it." He is with the Hartford-Empire Company, Hartford, Conn.

Arthur Manson writes from East Pittsburgh where, you remember, he is with the Westinghouse Electric and Manufacturing Company. "My whole activity has been in connection with transportation, which, from our definition, includes locomotives of one and a half tons, as used in the metal mines, and rated at five horse power, to locomotives of 641 tons and over 7,000 horse power, now used in hauling coal on the Virginian Railroad; the trolley bus with a capacity of 50 to 55 people to large multiple unit subway equipments with a capacity of 560 persons, as well as Diesel electric, turbine electric, and turbine geared equipment with electrical auxiliaries for lights, pumps, winches, and so on, for Marine service. I have just received the appointment of Assistant Sales Manager of the Transportation Department.

"As I remember, one of the questions asked at the time of graduation was, 'Would you send your boy to Tech?' You know, I had this problem in 1929-30 with my boy getting through high school and desiring to go to college. Recollecting that the consensus of opinion of the Class of 1905 was negative, and not desiring to handicap the boy, I brought up all of my big guns in favor of Cornell. Somehow or other I must be a poor salesman because the boy decided on Technology, and this spring, 1931, finished his freshman year. I think I will have to admit that right down in the bottom of my heart it was rather pleasing that he had decided to go to my Alma Mater." — ROSWELL DAVIS, *Secretary*, Wesleyan University, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

## 1907

On October 1, John Frank wrote us the following letter: "I have just read in The Technology Review of the death of Nat Middleton, and, needless to say, I am shocked. I had not heard anything about it before and I find it difficult to think of Nat as dead. He was so vital, so big-hearted, and so full of life. It is a real loss to the Class, but the memory of him is a pleasant one.

"I do not know any news except that Sam Marx, Stud Leavell, and I held a little informal reunion here in Chicago, the other day, gathered around a bottle of ginger ale, and settled most of the important affairs of the nation.

"Stud has invited us to come down to Tulsa the end of October and visit him in his new Arkansas log cabin. He says we might as well get used to one because we will all be living in them soon. Chances are, Sam and I will go down and see what it is like. — We also mentioned in passing the Twenty-Fifth Reunion, which comes

next June. Believe it is none too early to begin talking about it, as we should try to make it the best one ever."

We have also received a letter from Frank MacGregor, in which he suggests the possibility of the men in the vicinity of New York City securing a private pullman to use in traveling to the place of Reunion. We appreciate greatly these friendly and interested reminders from members of the class regarding our Twenty-Fifth Reunion, to be held next June. We very eagerly welcome any suggestions on this event. At a previous class gathering, it was quite unanimously felt that no better location can be found than a place on the South Shore of Massachusetts and that the proper general program is a week-end of festivity. For dates, how does June 16 to 19 sound to you? Nothing definite is done as yet. Write your Secretary your ideas.

The New York Times of October 5, 1931, contained the following article under the heading: Soviet Gives American Expert \$7,500 Prize and Orders His Methods Used in All Mines. Moscow, Oct. 4 — "A public recognition of American industrial methods was given by the Soviet Government yesterday in the form of a tribute to H. J. C. MacDonald, mining engineer of Denver, Colo., for his work in the development of Russian metallurgy.

"A decree, made public by the Soviet Supreme Council, not only expressed the thanks of the Soviet Republics for the introduction of the American system of mining, but it rewarded Mr. MacDonald with a prize of approximately \$7,500 and announced that his methods would henceforth be employed in all enterprises dealing with non-ferrous metals and iron and steel.

"All enterprises dealing with black, or iron, steel and colored or non-ferrous metallurgy," the decree said, "proposed hereafter to use the system of Engineer MacDonald, which has been in practice for three years in the Ural and Altai organizations on colored metals." The decree called attention to the fact that Mr. MacDonald's system had resulted in large economies.

"Mr. MacDonald, who holds a high consultant position with the Soviet mine trusts, said: 'I am naturally grateful for the honor, but, of course, the work for which it is bestowed would not have been possible without the coöperation of the Russian officials and workers with whom I am associated.'

"He is a pioneer among the American specialists who are taking an increasingly large part in Russia's industrial development and he is now in his fourth year here, chiefly engaged in planning the mines and metal work. Most of his first two years were spent in the Ural Mountains, but he is now stationed in Moscow. He is virtually in charge of all planning, administration, and exploitation of most of Russia's mines." — BRYANT NICHOLS, *Secretary*, 19 Rowe Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1909

The sudden passing away of Dr. Stratton takes from our midst a man who has done much to enhance the prestige of the Institute, both at home and abroad. A man of kindly disposition, he was beloved by all with whom he came in contact. Brad Dewey, President of the Technology Alumni Association, was one of the honorary pall bearers at the funeral services. Carl Gram and Charlie Main represented the Class of 1909.

On July 8, 1931, one of our classmates, Waldo C. York, passed away at his summer home in Cotuit, Mass. At the time of his death, York was employed by the New England Power Engineering and Service Corporation, and we are indebted to J. A. Cushman '03, also a member of that organization, for the following information:

"York was born in New Bedford, Mass., on July 22, 1887, and received his S.B. in Civil Engineering at Technology in 1909. In 1910 he entered the employ of the Cape Cod Canal Construction Company and had an active part in the building of the Canal.

"In 1912 he went to Panama and was engaged in engineering work in connection with the Panama Canal until 1914. In November, 1915, he entered the employ of the Power Construction Company as instrument-man on the construction of the Readsboro, Vt., hydro station. Upon the completion of this work, he was engaged in various construction activities on the system. In March, 1916, York entered the employ of the United States Government in connection with railroad evaluation work, returning to the employ of the Power Construction Company in November, 1916. During the second period of his employment by the Power Construction Company, he was engaged in the construction of the Pawtucket Substation and various customers' substations and transmission lines. In January, 1918, he entered the employ of the Aberthaw Construction Company, returning to the Power Construction Company in April of that year. He became Transmission Line Engineer in 1926, which position he held up to the time of his death. During the past 13 years he was actively associated with all of our transmission line projects and his work included the supervision of the right of way and property acquisitions for the entire system. In addition to a keen mind and brilliant executive ability, Waldo had the rare gift of friendliness and could 'walk with kings nor lose the common touch.' He leaves behind him an enviable record of work well done. His many little acts of kindness will keep green in the memories of all those who knew him the true worth of Waldo Cornell York."

Last summer Mollie Scharff was laid up in the hospital for several weeks as the result of an operation following an automobile accident which he had last summer. We are happy to say that Mollie is now able to be around again and to resume his usual activities. — John Willard reports that, during a recent trip to

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Cleveland, he ran across Brainerd Dyer, who is now Sales Manager of the Vitreous Products Company.

Bill (W. H.) Jones, who has been on the Technology faculty since the spring of 1911, has recently been promoted from the grade of Assistant Professor to that of Associate Professor. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, First National Bank Building, Pittsburgh, Pa.

## 1910

Another month rolls around with only two of the Class heard from. The Review office sends me another review of Stuart Chase's book on Mexico, but we mentioned that last month. — Herbert Cummings writes, signing himself Assistant Director of Social Hygiene of the State of New York: "As a member of the entertainment committee of the Kiwanis Club, I endeavor to assist in making the programs interesting enough to keep the men attending regularly. This is simple compared with my vocation which is an attempt to influence young men and women to so live that they will not expose themselves unnecessarily to social diseases. Statistically we have made little progress, but we are still hoping to control these diseases, at least in part."

Philip Devlin sends in a good long communication from Jacksonville, Fla. "Your request of the 30th for class notes for The Review rather put it up to me, although my stay at Technology was only for a short term. The old cold winds around Rogers and Walker were too much for blood tempered to Gulf breezes in my former home in New Orleans. After leaving my old Course IV (architecture) in February, 1907, I later took my sophomore year at Tulane University, only to decide later that the world could spare my services as an architect."

"For 15 years I was engaged in the Naval Stores business, being located at one time or another in just about every section of the southern pine belt. During that time, I acquired, some 20 years ago, a wife in the person of Miss Frances Moore of Missouri. Contrary to the modern trend, I still have the same helpmate plus three children in high school."

"I came to Florida in the fall of 1924 and have been here since, engaged in the practice of public accounting, with a lapse of 18 months when I was engaged in the real estate game with a younger brother in South Florida. This, of course, was during the height of the lamented 'boom' and we saw it all."

"The oddest thing that I can offer from a Technology news standpoint is this: When I said so-long to the little crowd that constituted my particular Boston buddies in 1907, it was a toss-up whether we should ever meet again. The old bro-mide about a small world held good, and at one time or another I have run into or heard from each of them either here or in New Orleans. First of all, Red Walter

Anderson dropped into New Orleans selling fraternity jewelry, while I was still at Tulane. I happened to be ill and missed him, as also a later visit from George Boddie of Kentucky, who passed through there and called at the house after I had moved on to Texas."

"Next, John Higgins showed up after a trip from San Antonio, which he insisted was just to look me up and reminisce a bit. He was with Stone and Webster then in Texas and I have lost sight of him since. Bill Cannon was next when he appeared in New Orleans with a job, married a local girl, and later emigrated to the tropics. About a year ago he was in Jacksonville and looked me up before departing for Palm Beach and oblivion. A year or so ago, I was in touch with Eben Chaffee out in North Dakota, where he is landscaping. Eben and I exchanged a few letters, but have not heard from him since last Christmas, when I had a card from him." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

## 1911

Technology and the world of science lost a wonderful man with the sudden passing of Dr. Stratton and the writer lost a warm, personal friend. Gordon Wilkes, II, was among the faculty ushers at the funeral and the writer also saw there Ralph Adams, II, of the faculty, and Walter Allen, XIII, now located in Framingham, Mass.

We are glad to hear Lloyd Cooley, X, is now Secretary of the Technology Club of Chicago. — Sam Cornell, XIII, and his wife were fall guests here on their way back to New York from a Canadian auto trip. He is now plant engineer for the American Chiclé Company at Long Island City. — George Estes, II, assistant agent of the Continental Mill at Lewiston, Maine, was named a director at the annual meeting this fall. He has been connected with the mill nearly 20 years.

Gardner George, I, has been appointed civil and mechanical engineer of the New York Power and Light Corporation, his headquarters remaining at Albany, N. Y., where he was previously superintendent of drafting, having charge of the drafting and blue printing work of the corporation. — Alec Yereance, I, acknowledged receipt of the Reunion Aftermath issue of *The Levever* with repeated regrets at his inability to attend, but "happy at last to note from the group photo that others of the Class are now wearing their hair the way I do — a sort of permanent (receding) wave, as 'twere." He is still regional appraiser for The Prudential at Washington, D. C. — W. t. D. — ORVILLE B. DENISON, *Secretary*, Douglas Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

## 1912

Ralph Riddell, I, dropped in on your Secretary the other day in the interest of the Burroughs Adding Machine Co. Ralph has worked up to District Manager for Burroughs and is very enthusiastic

about their products, which have been diversified to include other office equipment besides their main line of adding machines. Ralph is living in Melrose, and boasts a family of four youngsters who are getting on toward high school age.

Your Secretary has just learned that Art Campbell, IV, who has not been heard from in years, is now located in Newton, Mass., as Building Commissioner. Two attempts to locate Art and pick up the thread of his wanderings since he was in China have been fruitless, as he was out on both occasions.

While in Montreal recently we enjoyed a very pleasant visit with E. H. Guilford, VI, who will be remembered as being one of the charter members of the Wireless Society while at the Institute. Guilford left during his second year to go into business with his father in Florida, where he was located until entering the First Officers Training Camp at the time of the war. Due to his interest in wireless, Guilford was commissioned an officer in the Wireless Communications Division of the Signal Corps. He was engaged in special research work, and after the close of hostilities remained in the army until 1924 on experimental work. Upon leaving the army he went with the Radiore Corporation as experimental engineer in California, where he helped develop their technique for locating ore deposits by means of wireless waves. He was transferred to Montreal in 1927, where he became Vice-President and General Manager of the Canadian subsidiary. As the business depression developed, ore prospecting naturally declined, and in order to diversify their effort, he has taken over the sales and distribution of the Petrol Automatic Oil Burner for Canada. Any '12 men in Montreal should certainly make it a point to look up Guilford, as his office boasts a bar annex. Better jot down the address: 410 Transportation Building, Montreal. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 10th Avenue and 36th St., New York, N. Y.

## 1913

Our mail bag for this month, while brief, is of quite a varied nature. The September issue of the *American Magazine* carried an article on "Icebergs" by Edward H. Smith, one of our classmates. Smith is a lieutenant commander in the Coast Guard and has been stationed at New London, Conn.

It is with regret we note the death of Claude Cairns. He died very suddenly from a heart attack at his home in Belmont, in June. He was for ten years President of the Acme Apparatus Company, manufacturers of radio and allied equipment, in Cambridge. Our sincere condolences go to his family.

The daily news brings to light that Warren Glancy is attempting a plunge into public life. He is running for the school committee in Waltham and has



1913 Continued

successfully carried through the primaries. Good luck, Glancy. — While browsing around town the other evening, we bumped into Al Brown, engineer for the Underwriters' Laboratories in Boston. While gossiping, along came Leo Hartnett, looking rather hot and bothered from his weekly match in a local bowling league. We had a nice chat with both classmates, no especial news, scandal, or even dirt was forthcoming. — Bumped into Cotton the other evening, but learned of no items of class interest.

Now for the big news. Our plea of last June was fruitful. A very fine letter from George Bakeman in Paris has been received. He writes in part as follows: "A few evenings ago I stumbled on my copy of the 1913 Class Portfolio and then spent the rest of the evening trying to recall the too often misty details of our days together at the Institute. I'm afraid that I was poor company for the family, as they were entirely unable to share my enthusiasm for people and events so far removed from our present life. Anyway, the experience made me see just how far out of touch I have gotten with my former classmates and made me wish that I could see them occasionally."

"It is really surprising how few 1913 men I have met since that last time we lined up in Huntington Hall, 18 years ago last month. As far as I know, there are none in France, although Jack Farwell was here until about a year ago. The trouble is, I admit, entirely with me as I have made no proper effort to keep in contact with my old friends. I'm a rotten correspondent and my life has been passed so much abroad that I've had little opportunity to attend reunions. But be that as it may, I'm going to turn over a new leaf and to start with I want to announce that all and sundry '13 men who may be passing through this corner of the world and who care to do so are cordially invited to drop in at 20 Rue de la Baume, Paris. I'll see to it that the city gates are opened wide for them."

"If our present plans are carried out, I shall get back to the States next year for a few months' vacation, with my whole family, viz., wife and three daughters. We have no definite plans but hope to spend the summer somewhere on the coast of New England."

"Since 1926, I have been with the Rockefeller Foundation here in Paris, as administrator of the European office. My efforts are under the immediate supervision of Professor S. M. Gunn, '04, who is the Vice-President of the Foundation in Europe. The work is interesting and agreeable. Please give my best wishes to any of the gang whom you run across." Let us hope those classmates abroad or contemplating going abroad will plan to call on him. — GEORGE P. CAPEN, *Secretary*, 50 Beaumont Street, Canton, Mass. ARTHUR L. TOWNSEND, *Assistant Secretary*, Room 3-435, M. I. T., Cambridge, Mass.

## 1914

Class notes this month are about as numerous as orders in these "repression" days. Apparently all '14 men are too busy

looking after their own affairs to take a moment to write the Secretary. A few letters would, nevertheless, be very helpful, particularly right now when friendships count so much.

There are two '14 men here in Boston who are gaining a wide experience in human contacts. Al Devine, who has been equipment engineer for the Department of Public Works for the State of Massachusetts, is now Assistant Registrar of Motor Vehicles, with the principal task of listening to the pleas of those unfortunate operators who have had their licenses revoked. This is probably the most complete application of engineering in the field of human relations that we have among the members of our Class. Devine is obtaining a reputation for handling this difficult kind of work in a most effective and judicial manner.

Quite aside from his duties as Professor of Chemistry at Technology, Leicester Hamilton finds time to maintain friendly contact with the dormitory students. With the enlarged dormitory facilities and with the increasing belief on the part of the students of their inalienable right of freedom, this work of Hamilton's calls for both courage and diplomacy. The fact that he enjoys the confidence of the dormitory students and they have shown a wonderful spirit in abiding by his regulations, in itself speaks for the success Hamilton has achieved in this work. He was one of the speakers before the Alumni Council, on the evening of October 26. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

## 1915

Here are some of the letters that came along with the class dues from our widely scattered classmates. First, there is a bit of irony from Chuck Loomis '16 written on one of my appealing letters. "Hope the Class of 1915 is not so hard pressed that it is necessary to solicit 1916 men in order to keep the wolf from the door." Now that is funny, but Chuck should be proud to assume a listing with the Noble Class of 1915, since 1916 has slipped into such decadence. Who in Detroit, I'd like to know, gave him my letter to write on?

In Pittsburgh, Ed Casselman, X, will receive a pleasant, awakening answer to his first paragraph: "'No news is good news,' so I see by our class column that all the members are healthy and prosperous. There is no change in my own status since you were here, so this letter deserves no rating under the heading of news. I hear from Stringfield, X, occasionally. As you know, he is on his own, engaged in the custom molding of bakelite objects in Los Angeles. Have not seen any '15 men for a long time."

The last paragraph in Allen Abrams', X, letter makes this not such a bad job after all. "You ask me for news about the Class, but ordinarily I do not run into many of the fellows except on my Eastern trips. Now and then I see Ted Spear who, as you know, is with the Oxford Paper Company, and Ed Schoeppe, who is an

architect in Philadelphia and who can design the swimming pool for that new country home that any of the members are going to build! Jack Little (but not little Jack Little) is in paper work with the Western Electric Company and I think he is now in the vicinity of New York. Art Munyan, who, I believe, exposed himself to our Class for a while, has broken into fiction and has had stories in both *Liberty* and the *Saturday Evening Post*.

"I want to congratulate you on the way you keep up the 1915 news, but I am afraid that if you don't have any better correspondents than myself, you will not be requiring very much space in *The Review*."

From Howard L. King, I, we have the following: "I am remitting occasional dues as requested. Two weeks ago I spent a day in Boston and enjoyed a call on Professor Spofford. My errand in Boston was to assist in preparing an estimate for the Silas Mason Company on the new traffic tunnel to East Boston. Incidentally, the Silas Mason Company was the low bidder. I do not expect to be connected with the new job since the Mason and Hanger Company is keeping me busy under and around the East River in New York."

I hope Ed Schoeppe, IV, means to be really funny in this: "Enclosed find \$2.00 — tough finding these days. Little enough, but what's it for? To get enough for postage to notify everybody to pay dues? One or two '15 men are here in Philly whom I see on rare occasions. Good luck on the collections."

Everybody remembers Joe Phelan, V, as a baseball catcher with a shiny bald head. Mrs. Phelan will need all of Joe's Course V formulas to produce any results on his ivory: "Glad to send you the check. Why don't you drop over to the Hood plant some day and see something in the line of modern wonder. The most exciting thing I can tell you is a good joke on Mrs. Phelan; she thinks she is actually growing hair on my bald head! Can you beat it? Still busy in the dairy business watching sanitary conditions. Oh, yes, Azel, I almost forgot, the Phelans have something running around the house now — a hedge. Say, who brought that up? Good luck, old top, and my best wishes for many printable letters in the near future. It's a darn shame some of the fellows out there don't drop you a line more often. They must have lots of stuff to write about."

Clarence L. Smith, VI, is rather complimentary, in return for which may he enjoy our enlarged notes: "In these days any Technology man deserves not only the two dollars but at least a few words of praise for his courage in asking for it. I think we take the class fund as we do the loyal Secretary — for granted, and without limit. So, rather than have our unemployed Secretary (I am thinking of some of *The Review* editions) have to make application to the Salvation Army, we should all rally with our last two dollars, if need be, and help him in his earnest desire to write and plead for news."



## 1915 Continued

"I am one of those unfortunate individuals pledging allegiance to two classes, '14 and '15, and so have to listen to the winning ways of Harold Richmond for '14, also. There is very little to say about my own activities. I am still here with the Kerite Insulated Wire and Cable Company, turning out wire and cable with the insulation which 'has withstood the test of three-quarters of a century.' Alan S. Dana, VI, is our research engineer and is constantly keeping us busy trying to follow his latest. I have enjoyed what news you have been able to extract from our extremely reticent classmates and certainly hope you have much more success getting the dues in."

Harry Murphy, I, is at a new address, 15 Fayette Street, Quincy, Mass. His firm is Massachusetts Engineering Company, Quincy. He writes as follows: "Enclosed is a check for two bucks to bolster the class fund. This is just about the total profit of this business of mine for the past year. Best wishes to you and 1915."

Twenty years ago Frank Scully, I, and George Rooney, I, were scampering around the old buildings of the Institute acquiring an education. Today as members of the Scully Company, Cambridge, they are building the new George Eastman research laboratory at the Institute. Frank and George are well pleased to have this job and are rather proud and happy to have the privilege of building such splendid additions to the Institute for the future training of its men. Some time ago Frank sold his interest in the Houdaille shock absorber, but recently he has become President of the Thermo Hydraulic Shock Absorber Company, to manufacture an improved shock absorber. George wrote me: "St. Elmo Piza paid me a visit at the Technology jobs yesterday, but unfortunately he had to leave for New York on the five o'clock boat so we could not step out in society." Just visualize the kind of society that pair knows. The Blue Book would never recognize it!

Jerry Coldwell, VI, closes the month for us with his typically bright and cheerful style, written from Chicago. He must be seeing America first on his job and having a good time doing it. As some of Jerry's choicest expletives have necessarily been deleted, copies of his original with all its humor may be had for the asking. "I think I must be on your 'sucker list.' What do you mean—I sent my dues last time so you'll take a shot at me again! Anyway here's the \$2.00 in check form, but I guess it's good."

"I haven't any news. I've been going places where other 1915 men have sense enough to stay away from, I guess. Possibly they were there but I didn't know it. I had a very wonderful New Year's Eve and New Year's Day! Both were spent in Minneapolis and I worked until 11 p.m. New Year's Eve and all day the first. Now isn't this a hell of a job? From there I went out to Fargo and Bismarck, N. D., and after three days out there I could nearly talk Swedish or Norwegian or some such language. Later on in January I was in Asheville, N. C., and

that was very fine. Nice blue sky all day long and no need for any kind of a coat after nine a.m., but I was only down there for about a week. Had a crew of 14 men so there was a bridge game every night. I managed to pry loose a little change from the boys. Frank Scully called me at the office the other day and by some rare good fortune I was in. Unfortunately, he didn't have time to come down town but he solemnly promises to do so next time. Here's hoping."

More next month! It's a little early, but a cheerful and happy Christmas to you all!—AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

## 1916

A recent issue of *Science and Invention* tells in detail of Bob Naumberg's invention. Bob has finally perfected his Visagraph, which enables the blind to read any ordinary ink-print or letterpress book. Sound has been completely abandoned, as it was proven fatiguing and unsatisfactory. The new machine uses the sense of touch alone, as it produces a magnified, raised image of the printed page, one line of printing after the other. The user simply has to run the forefinger over the embossed letters, which are produced automatically. Bob Naumberg is now located at 40 Meadow Way, Cambridge, Mass.

Frank Chandler has recently become affiliated with the John S. Martin Coal Company at Marblehead, Mass., as service engineer. Frank is now making his home on Bubier Road with his wife and three-year-old son.—Another President has been added to the long list of classmates. This time it is Isadore Richmond, who has recently been elected as President of the Boston Architectural Club.

Steve Brophy has become associated with Kenyon and Eckhardt in New York City as first Vice-President. Steve should do well, as he likes advertising and has a fine record of sales promotion work.—R. W. Wilson, who has been in charge of research work for the Standard Oil Company of Indiana, has just been elected as one of the directors of the company. Bob is the inventor of a number of the new processes and products used or made by the company and is the author of more than 60 technical papers, most of which relate to problems of corrosion, lubrication, motor fuels, and cracking. He is also a director of the American Chemical Society of the American Institute of Chemical Engineers.

Bill Shakespeare is still attached to the Anaconda Copper Mining Company and is in charge of interesting developments which they have under way in connection with the electrodeposition of sheet copper.—M. O. Schur is now head of the Research Department of the Brown Company in Berlin, N. H.

Ralph Bennett has been in the famous East Texas oil fields and when the Martial Law was declared recently, he was able to take a much needed vacation. He has been spending his vacation at his father's home in Lowell, Mass., with Mrs. Bennett and their 13-year-old daughter.

Lieutenant Walter J. Wolfe has recently been transferred from Fort Wright, N. Y., to Fort Kamehameha, Honolulu. Another classmate is also in Hawaii—none other than Captain Charles S. Reed, who is now located in Schofield Barracks, outside of Honolulu.—Professor Herbert J. Gilkey is now associated with Iowa State College in Ames, Iowa.—HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, 7337 Woodward Avenue, Detroit, Mich.

## 1917

We heard from three nearly lost souls this month. In fact, it is so long since we have heard from one or two of them that it is almost necessary to look them up in *Technique* to see who they are. Good old architect Frank Carson says: "I am quite out of touch with the old stamping ground and the Romeos who stomped around there ten to 15 years ago. I suppose for your part you have, no doubt, outdone me in the matter of supplying a new generation to carry on, since you had a considerable start on me. However, I have two choice little Americans in my family, a girl and a boy, of five and three. They are a joy, but I have decided not to go out for any records. They are also a care. I have heard within the past year from Ray Gauger and Bill Bealer. I hope to get back to Boston some day, at least long enough to renew acquaintances. In the meantime I send my best regards." Frank is teaching at Ann Arbor, Mich.

Again Dean Parker made up for lost time when he wrote from Philadelphia: "I have been with the du Pont Company since 1926 in the Central Technical Laboratory at Philadelphia, where we do all the development work for the Paint and Varnish Division of the company. We have done most of the work here on Dulux, which is a synthetic material adaptable to all kinds of products in the paint, varnish, and enamel field. We have spent a lot of money on it and have just begun to cash in. We hope it will be as good a money maker as Duco was in the lacquer field and the prospects in this direction look very good. We are running a sizable number of gallons even in these hard times and if we get a few breaks, should do a lot better. At the same time we are keeping abreast of the developments in all synthetic resins which are rapidly revolutionizing the industry, particularly in the varnish and enamel fields."

"My particular job is handling all the durability tests, especially outside exposure. We pay a lot of attention to this phase and probably have more panels under observation than any four of our competitors put together. We have about 20 thousand panels on exposure in various parts of the country and it is quite a job to keep track of them. We have three men in Florida who do nothing but examine panels, one in Texas (part-time) one in Colorado (part-time) and three in Philadelphia. I have to look after them and write up the dope obtained. It is a lot of fun though and I wouldn't want to

1917 Continued

miss it for anything. I bought a house here four years ago and have four children, two in school, so I am pretty well anchored.

"What do you know about Malcolm Brock and others that I used to know? I am afraid that I have been sadly remiss in keeping up with my old friends."

And from one Claudius Henry Mastin Roberts: "About six months ago, the company with which I was formerly connected — Wm. S. Barnickel and Co. — joined forces with the Petroleum Refining Co. to form the Petrolite Corporation. The former company treats crude oil emulsions with chemical reagents to resolve the emulsion, while the latter uses electricity. In recent times, there has been quite a bit of combination work done, where both chemical and electricity are used. Hence, it seemed desirable to combine the outfits, so as to offer the oil producers either method or a combination of both, according to which best met the requirements of a given problem.

"For some years I had been doing fundamental research for the chemical company — determining physico-chemical properties of emulsions, and so on, and the changes associated with resolution of emulsions. This work was, naturally, right along the same line as that being done by the electric company, so it was decided to have all of the fundamental work centralized and the California laboratory was chosen as the locale for the work. That meant that I and my assistant had to be transferred out here. Very simple. I haven't run into any Technology men yet but understand that there are a few hiding out here and there. When I catch my breath I'll dig out the alumni register and see how many I can find. Meanwhile, I have been quite busy installing and reorganizing the mess of equipment which I brought out with me, trying to get some work started and giving birth to reams of reports, theories, and what have you. If this 'unusual' spell of California weather will ever get finished, I think it will prove to be a fine place to live and work."

From the New York *Tribune*, relayed from Swampscott, Mass.: "Mr. and Mrs. William F. Dawson, of Lynn, have announced the engagement of their daughter, Miss Julia Frances Dawson, to Lieutenant Gerald Whaley Thomson, U. S. N., son of Mr. and Mrs. David Thomson, also of Lynn. Miss Dawson is a graduate of Wheaton College, and Lieutenant Thomson is a graduate of Technology, a member of the American Institute of Naval Engineers, and of the Army and Navy Club of America."

Mr. Luce's Press Clipping Bureau mailed us this interesting item from the Providence *Journal*: "I. Edmund Waechter, who has just been made metallurgical engineer of the Bartlett-Hayward Company of Baltimore, Md., was engineer for the Brown and Sharpe Manufacturing Company of Providence from 1922 to 1924. Since that time Mr. Waechter has been engaged with the General Chemical Company of New York from 1924 to 1926, general superintendent of the Illi-

nois Foundry Company, of Springfield, Ill., 1927 to 1929, and metallurgical engineer and assistant manager of the National Bronze and Aluminum Foundry Company from 1929 to 1930. Mr. Waechter is a graduate of Harvard and Technology."

At press time we learn that H. P. Eddy, Jr. is the newly elected Vice President of the American Society of Municipal Engineers. Congratulations!

Comments heard here and there indicate that the Reunion at the Corinthian Yacht Club next June will be well attended — depression or no depression. It is not too early to begin to plan for it. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge.

## 1918

"Good class notes, we are sure, are balm of Gilead these trying days — a very potent antidote to pessimism — but surely they can still be this with all the superfluous material deleted," say the Review Editors, so here goes.

From Chicago, now purged of the calamitous leadership of Al Capone, comes announcement of the marriage of Wendell Potter Monroe to Evelyn Thayer Cox. When we last heard of Monroe he was utilizing his B.S., S.M., and E.E. degrees in the interests of Jackson and Moreland, Ferry Street, Hoboken.

From the San Diego (Calif.) *Union* of August 30 comes a clipping (by freight, or perhaps it was ox cart). It seems that a new First Avenue Bridge has been built in record time. A brass plate, dignified by the seal of the city, adorns the rail, carrying among other items the name of R. Robinson Rowe, structural engineer.

In the black and searing paragraphs of the book reviews of this issue, there probably appears some comment on the sleazy scandal of cutting down stately spruce trees in order to print the sort of sapless and strangled book which emanates from the same pen that is writing this. Ho hum. Life would be a pretty dull business without a certain amount of struggle. Anyway, we got quoted in *Time* (October 5, 1931) as authorities in the field; anyway, the name below is to be found on the title-page of four published books, one now being set up in type, and two more contracted for, but not yet riveted together. But we shall shudder and weep quietly into our breakfast coffee cup just the same if Dan Sayre has seen fit to let his leaping imagination wreck its ugly hoodlumism on our misty past. We might even wish that the office boy had chewed the manuscript to pulp and swallowed it. — F. ALEXANDER MAGOUN, *Secretary*, Room 1-305, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

## 1920

Here is interesting news from K. B. White. He says in a recent note, "I am leaving my job with Simplex Wire and Cable Company to join the staff of Wallace Clark and Company, 8 Rue Jean-Goujon, Paris (8<sup>me</sup>), France. For an indefi-

nite period I expect to be doing consulting work in France and Germany. I am afraid from this range I cannot add much to class notes but you may be sure that after I have been there for a while I shall send you another letter, if there is anything of interest to report." If we know our K. B. White and our Paris, there ought to be something interesting to report.

I am backed up on this item by a note from Scott Wells who said he ran into K. B. at Back Bay Station just as he was off to Europe. Scottie signed his note "Yours for more news." If I could get coöperation from anyone else in the Class as well as I have from Scottie, his wish would be granted. — A welcome announcement from Ralph Booth concerns the arrival of Ralph Douglas Booth, Jr., at Longwood Towers, Brookline, on September 10. Congratulations from the Class to Mrs. Booth and yourself, Ralph.

Your secretary spent a very pleasant and strenuous evening across the ping pong table from Bud Cofren a few days ago. Bud looks as if he had completely recovered from the effects of his thrilling and hazardous voyage on Somerby's cruiser after our little Reunion last spring, during which they were becalmed, lost, stranded, and almost scuttled by fire before making port. If space and the editors of the Review permitted, I would like to recount this epic in detail. All I can say is if any of you see Bud, be sure and get him to tell you the story. Incidentally, he called to my attention the glaring omission of Scott Wells in my list of those present at the Reunion. Scottie was there — very much so. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth St., Winchester, Mass.

## 1921

As we write these notes there comes the sad news of the passing of Technology's distinguished administrative chairman. In behalf of the Class we have expressed to Dr. Compton and the Corporation our sincerest sympathy in the loss of a beloved leader.

Weddings seem to predominate in the class news this month and we join in the chorus of congratulations to the newlyweds. From Chicago comes the announcement of the marriage, on September 15, of Miss Cathrina S. Johnstone and William B. Plummer. — Mrs. William B. Sullivan announces the marriage of her daughter, Katherine Ellen, to Charles Henry O'Donnell on October 12, at Danvers, Mass. Charlie is now manager of sales and service of the House Heat Department, Boston Consolidated Gas Co., 100 Arlington St., Boston. — From the New York *Herald Tribune* of October 11, 1931: "At Wyckoff, N. J., Miss Betty Beggs, daughter of the late Mr. and Mrs. John E. Beggs, of Paterson and Glen Ridge, was married yesterday to Mr. James Rowland Hotchkin, son of Mr. and Mrs. William R. Hotchkin of Montclair." Following a trip to Bermuda, Hotch and his bride will reside at 96 Haddon Place, Upper Montclair, N. J. He is President and Treasurer of the Palnut Company, Inc., of Irvington, N. J.



1921 Continued

We apologize to A. W. Skilling for not being able to visit with him on our recent trip to Pittsburgh. In a brief telephone conversation he promised to send us all the news of the local 1921 family for presentation on these pages. Art is with Morris Knowles, Inc., 507 Westinghouse Building, Pittsburgh.

From the Honolulu, T. H., *Bulletin* of September 8, 1931: "Major Stanley L. Scott, Corps of Engineers, U.S.A., will arrive on the army transport *St. Mibiel* tomorrow to assume his duties as United States District Engineer here. Major Scott was graduated from the U. S. Military Academy in 1912."

Anthony Anable is a chemical and metallurgical engineer associated with the Dorr Co., Inc., of 247 Park Ave., New York City. Tony was married in 1924 and has two children, Anthony, Jr., and Joan, six and two years old, respectively. — James S. Parsons is manager of Shippee and Rawson, members of the New York Stock Exchange, 111 Broadway, New York, and makes his home at 30 Fifth Avenue. — Robert B. Frost is Assistant Superintendent and Plant Engineer of the Lone Star Cement Co., Inc., of Hudson, N. Y., where he lives at 444 Allen Street. Bob was married in 1927 and has a daughter, Elizabeth Whitney, born last year. — A. J. Shaughnessy, who still enjoys the state of blessed singleness, says he is manager of the Hertz Driveurself System, Inc., South Boulevard, Pontiac, Mich., and lives at 344 West Himon St., Pontiac. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Co., South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.

## 1923

In asking Bill La Londe, Jr., I, how come he moved to a new house recently, I learned that he is still associate professor of civil engineering at Newark College of Engineering, where he is teaching highway and structural design and is in charge of the civil engineering department of the technical school. He has been married five years and has a daughter, Marilyn, 14 months old. — Joe Nissen, XV, was married this summer and has settled here in Cambridge. He has been teaching mathematics and chemistry at Rindge Technical High School.

S. F. Brown, XIV, who is teaching at the Institute, sends in the following two items: Oscar L. Perkins, XIV, was married to Helen N. Collins at Ottawa, Canada, on September 7. The couple are at home at 19 Denison Street, Hartford, Conn. Last month the marriage of Fred Mann, II, to Helen Bensen at Quincy was reported. Brown furnishes the additional information that they are living at 45 Beach Street, Wollaston, Mass.

Joel Lund, XV, was married at St. Louis on October 17 to Erle Hall Harsh. Joe is Production Manager of the Lambert Pharmacal Co. — I regret to report the information received from the Alumni Secretary that Joseph Tower, Jr., XII, lost his life in a drowning accident in August.

Recent address changes which probably have some significance are: Dr. William P. Allis, VIII, from Munich, Germany, to Cambridge, England; Clark Barrett, X, from Chicago to Brattleboro, Vt.; Gerald Putnam, I, from Delmar, N. Y., to Dorchester, Mass.; Lt. Walter E. Richard, IX-B, from Mt. Clemens, Mich., to Mather Field, Sacramento, Calif.; William Webster, XIII-A, from Norfolk, Va., to Boston; James B. Wyman, VIII, from Omaha, Neb., to Portland, Ore.

Pete Pennypacker sends in the following details regarding the annual "stag" dinner and election of officers of the New York Club of 1923. It was held at the Technology Club, on Thursday, October 15, with the following present: John A. Frank, IV, Francis J. Kurriss, II, Charles M. Mapes, VI, Walter S. Marder, Jr., II, Stephen J. Miller, II, David Kaufman, X-B, Albert J. Pyle, VI, John W. Sands, XIV, Lyman L. Tremaine, II, Walter W. Zapolski, I, and James A. Pennypacker, XIII. There was considerable discussion of the idea advanced by George Bricker suggesting Chicago for our next reunion. It seemed to be the consensus of opinion that our ten-year reunion should be held in the East at a place within a day's drive from either Boston or New York, because most of the members of the class are located in or near these two cities.

The following officers were elected for the coming year: President, Charlie Mapes; Vice-President, Lem Tremaine; Secretary, Walt Marder; Treasurer, Pete Pennypacker. The tentative program adopted for the year includes a stag get-together in early January, a dance in February, a spring outing, and a fall dinner. After the business meeting, the program consisted of having each man speak informally, covering a number of definite points listed on a sheet provided by the program committee. In addition to personal matters, the main topic each was asked to cover was the depression. All had ideas on this and the program seemed to be enjoyed by everyone. Only one man among those present proved to be without a job.

Most of the following items were obtained from first-hand or hearsay information contained in the talks. Johnny Frank, IV, is an architect associated with the firm of Doane and Aldrich in New York City. In addition to other duties he has a part in designing the new post office building which is being planned for the City of Washington. Philip C. Smith, VI-A, Rodney M. Goetchins, VI, and Francis J. Kurriss, II, are associated with the New York Telephone Company. Kurriss is a dial equipment engineer. Charlie Mapes, VI, is with the American Telegraph and Telephone Company in New York. Walt Marder, II, has been absorbed in building his own house on a farm near Plainfield, N. J. Al Pyle, VI, has become ship-minded and has a motor boat which he operates on the Hudson. Stephen J. Miller, II, is with the Meeker Foundry Company, making malleable castings. Walt Zapolski, I, is with the

Port of New York Authority. He reports that Edmund S. Pomykala, I, Arne Lier, I, and Peter Petersen, I, are all with the same concern. After his graduation Zapolski studied at the Harvard Business School. Dave Kaufman, X-B, is taking a night course in architecture at Columbia University.

In more prosperous years this class has contributed \$50 annually to the Alumni Athletic Fund. Our present collections for this fund amount to \$11 from a total of two contributors. We've made no call for contributions from everyone for this fund for several years and none will be made at present except to repeat the suggestion I made last May that a few of those of you who can afford it send in at least \$10. If only three more persons will do this, I will make the fourth and we can send along \$50 and make Dr. Rowe happy. — HORATIO L. BOND, *Secretary*, 31 Concord Avenue, Cambridge, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

## 1924

It is with pleasure that I announce at this time the appointment of Jose Loubriel as Course Secretary of Course V. I trust all the chemists will rally around and send in their congratulations, so he will have some news of you to publish in an early issue.

The New York end of the Class has started its monthly luncheons again. The first was held on Tuesday, October 6, at the Planters Restaurant as heretofore. The Planters is located at 128 Pearl Street, between Wall and Hanover. The guiding light of these luncheons is Anatole Gruehr, located at 4 Irving Place, New York City. He is looking for more converts to the idea so that our ranks in the city can be expanded.

The Class at this time is not conducting a campaign for funds for rather apparent reasons. Nevertheless, your Secretary has received from Dr. Rowe a very sincere and urgent request that the classes offer as much support as possible to Undergraduate Athletics through the Advisory Council. As a Class, we are not able to do anything, but I feel there are many in the Class who will need very little urging to send Dr. Rowe a check at this time, when, I can assure you, his need is greater than it has ever been. His address is 80 East Concord Street, Boston, Mass.

Late in August, Rock Hereford was married in San Francisco to Miss Mardo Leppo, daughter of Mrs. David Leppo of San Francisco and a graduate of the University of California at Berkeley. They are now living in their own home at 741 South Euclid Avenue, Pasadena, Calif. — And, gentlemen, here is the news of the moment: Mr. and Mrs. Martin J. Lahan of Fall River have announced the engagement of their daughter, Ruth Evelyn Dailey to President William H. Robinson, Jr. Congratulations to Bill; but for my part, I shall demand an explanation as to why he has deserted me without warning or opportunity to erect a defense. Just what my defense could



1924 Continued

be is unknown. Even the best are known to fall. — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn.

### COURSE XIII

After a lapse of a year, I will try to give you a little information regarding the activities of Course XIII. Not much has happened that is particularly new regarding the positions or locations of the members of our course, at least those with whom I have been able to get in touch. The most important event probably happened on July 30, when Fred Ashworth became the proud father of a daughter, Miss Virginia Ashworth.

Ernie Stone, who has not been heard from since he announced his engagement, has been located in Berlin, N. H., where he is employed by Brown and Company. Ernie is still single. I hope to have something definite regarding his present position for the next issue of *The Review*. — Gubby Holt was in Boston for a short time during the summer while on his vacation and I had the pleasure of having lunch with him. Gubby is still with the National Biscuit Company and is living in West Nyack, N. Y. Last spring, Ashworth, Russell, and myself spent an enjoyable week-end with our families at the Thayer's home in Weymouth. We are still located with the same companies, which we have been with for the last few years, so that nothing of news can be reported from that meeting. — El Thayer suffered an accident during September, when he received a broken toe, and is just now off crutches and trying to get around.

Information regarding the other fellows in the course is badly wanted, and here is hoping that some of them reading this may become interested enough to send along a note to the Course Secretary, who now has a new address. — GORDON C. JOYCE, *Secretary*, 26 Garland Street, Melrose, Mass.

### 1926

Paul Boyd, XVI, was killed in an airplane crash on September 8, 1931. For a number of years he had been test pilot for the Curtiss Airplane and Motor Company and his death occurred in Buffalo. — On August 2, 1931, Thomas R. Hughes, I, died in St. Joseph, Mo. He had been an engineer for the American Waterworks and Electric Company in New York City. These two unfortunate and untimely deaths bring the total class mortality to 17.

The other deceased members are as follows: Ulysses Grant Barnard, William D. Burton, Hiram M. Datesman, Alfred M. Flaherty, George T. Gould, Oscar E. Hanson, Elmer F. Knight, Andrew Lambertus, Neil S. MacKelvie, David H. McCulloch, Owsley B. Robinson, Roger A. Rust, Lewis N. Sanford, Augustus Villalon, and Arthur E. Watkins, Jr.

The following letter from Joseph H. White was received recently by the Secretary: "I would like to give the Technology men a little picture of my doings since graduation in 1926. I started work-

ing with the Aberthaw Company in Boston and the surrounding towns with the field force. During my stay with the company I obtained training in job surveying, engineering, timekeeping, and cost accounting.

"I next joined the Stone and Webster organization and worked in a steel squad for a period of eight months. Then work became scarce in the office and I was transferred to the Blackstone Valley Gas and Electric Company of Pawtucket, R. I., a subsidiary of Stone and Webster Company. At this point in my career (July, 1927) I got married. While working in Rhode Island, I received a great deal of helpful training in drafting and city and topographical surveying.

"In the following year, I took the position of architectural engineer with the Hallowell Granite Works of Augusta, Maine, to work for four months on making the paper and zinc patterns in full size for four fifty-foot and two one hundred-foot arch spans for the stone in the Arlington Memorial Bridge at Washington, D. C. The work also included laying out the zinc pattern arches in full size on a floor, which work had to be checked to the hundredth of a foot by a Government inspector.

"On February 18, 1929, our first son was born in Boston. I had taken a position as structural engineer with the Goodrich Rubber Company at Akron in February, 1929. My family joined me in Akron six weeks after the birth of my son, Joseph Henry White, Jr. My work with the Goodrich Company has been very beneficial to me. I was in the office working for two years. During the time I worked at concrete and structural steel designing, checking of all architectural plans and specifications as well as designing heating systems. The work involved the preparation of drawings for the erection of super-service stations carried on by our company. In May, 1931, Goodrich decided to stop the building program. I was then employed to carry out some of the remaining field work left undone. I was sent to Milwaukee for the summer as building inspector. I am now located in Syracuse for a period of two months on some more building inspection work. My home is located in my headquarters' city, Akron." — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

### 1930

The wedding march is apparently still being played. About all the news we have to give this month concerns weddings. On August 25, Lt. Wirtz married Miss Jane Sloman of Rochester, N. Y. Lt. Wirtz attended Technology after his graduation from the Naval Academy. — On August 29, Stefan D. Van Norman married Miss Elizabeth Eddy Parker of South Warren, Mass. — Then on October 11, the wedding of Charles F. Flint and Miss Janet Crawford Brodie, which had been postponed because of Charlie's illness, finally took place. Mr. and Mrs. Flint are now living at 125 West 16th Street, New York City.

On October 24, Howie Gardner was married. The lucky girl was Miss Harriette Elizabeth Richards of Maplewood, N. J. This undoubtedly accounts for the lack of notes for Course X. Howie probably was too busy and too blissful to even think of such matters. However, we will excuse him this time. — We also received a letter from Bob Reynolds. He is now working in Lynn for G. E. He reports that he has no news for Course XV, but that rumor has it that George Schatz has taken the fatal step. If the members of Course XV will write to Bob, he will get the news in *The Review*. His address is 14 Chancery Court, Lynn, Mass.

Word comes from Newburyport that Worthen Taylor of Course X has been appointed as chemist in charge of the shellfish chlorination plant of that city. Worthen has been working in Chicago up until this appointment.

And that is all the news. If you want more, write to your Course Secretary and he will send it in. If you don't know who he is, write to me and I will forward your news to him and his name and address to you. Let us know what you are doing or what your friends and classmates are doing. — MORELL MAREAN, *General Secretary*, 1239 Norwood Avenue, Niagara Falls, N. Y.

### COURSE VI-A

Frank Burley was married last July to Miss Pearl Wilson in Lynn, Mass. He is now happily established in West Collingwood, N. J., and is working in radio research for the RCA Victor Company in Camden, N. J. — William Wanamaker is also working for RCA Victor in research on television. — Earl Ferguson is working in the executive department of the New York Telephone Company. Bub Wilson is also with the New York Telephone and is stationed at Buffalo. George Schaible, another telephone man, is with the same company at Albany, and we hear that he is soon to be married. — Ed Prendergast and William Griffith are now in Jersey, working at the Kearny Works of the Western Electric Company.

We are sorry to hear of Charley Flint's recent operation for appendicitis. He is resting comfortably now and will be back at work with the New York Telephone Company in a couple of weeks. — EARL E. FERGUSON, *Secretary*, 317 West 56th Street, New York, N. Y.

### COURSE XVI

This business of squeezing blood from red turnips is pretty bad. I've written to each of '30's aeronautical geniuses and I've had just one answer and that was not for official publication. Someone with a brilliant idea as to how to write course news without any news will please pass the idea on to me pronto.

An unsolicited note from J. P. Thompson reveals the fact that he has a very interesting job at the Naval Aircraft factory in Philadelphia. Previous to this he worked for Ford and on a government acquisition survey in the Allegheny National Forest.

1930 Continued

Linderoth finally broke the ice just after this last was written. He is still designing streamlined toothpaste tubes — or rather, he is "now chief engineer of the company. Business is good and we are all happy." (He must be in league with Hoover.) The name of the outfit is Peerless Tube Company, Bloomfield, N. J. Lindy is doing a little mechanical engineering along with some electrical and hydraulic. He claims to have designed, single-handed, two conveyor systems, laid out and put in operation a rolling mill, and designed and built an annealing furnace. He's now working on a photo cell application for inspecting his tubes and on a new type of printing plate for lithographing them. Golly, I wish I was smart like that. It's lucky he took Course XVI or he never would have known all those things. He has met the girl and doesn't think marriage is a calamity. Oh-oh! Lindy says Garrett Green lives right around the corner and is now a builder of ships for the Federal Steel Company in Kearny, N. J. He gets some swell parties breaking in the ships.

Hugh Mulvey is still with the Ketter Autogiro, according to Thompson, and from newspaper reports of that particular job I guess he must have shown them a couple of Professor Koppen's own special wrinkles. — I suppose I've forgotten by now most of what little engineering I ever knew, but I've finally sprouted a pair of real wings and am actually flying. It's not very much fun, but I like it. So far I've managed to scare myself nearly to heart failure on every cross country trip, but I'm hoping it's finally all out of my system. I recently flew a Curtiss Hawk to New York, for instance, and wandered around the harbor in a fog for more than 40 minutes at 120 miles an hour or better. I finally located myself by missing the Statue of Liberty on my starboard hand by about 30 feet. The Department of Commerce has finally issued me a student pilot's permit so I can fly someone's old ox-5 Eaglerock. — FRANK H. HANKINS, JR., Secretary, VP-10-S Fleet Air Base, Hampton Roads, Va.

## 1931

The wanderings of the Class of '31 are being reported to a slightly greater extent, and as we go to press we may report as follows:

H. P. Champlain sends word that "she's steaming easy" at United Fruit, where our Class President is employed along with MacKinnon. — Johnny Elting, Secretary of Course VIII, has returned to the Institute for graduate work, and writes that both John Dodge and C. W. Martel have done likewise and are now working in advanced physics. Powers has also returned, while C. W. Rankin is with Brown Company in New Hampshire doing color work.

Otto Kohler, Secretary of Course IV, and Gid Rice are employed by the Fred L. Rice Company, erecting a half million dollar hospital in Hartford. Gid is doing all the office work from the broom to the design. Otto does the field engineering and runs the steel gang. (Just a couple of

strong boys learning the heavy hardware business.) John Tillinghast is working for an engineering company which he did not name, drilling for deposits of iron ore in Minnesota. He still thinks Minnesota is the bunk, and longs for the East, or maybe it's yeast. Erwin May, from last reports, was getting some graft job in the City of Chicago Building Department. He will never know how much IV-A is indebted to his coffee pot for inspiration. Send all your news items to Otto C. Kohler, 49 Oxford Street, Hartford, Conn.

From John N. Dyer, Secretary of Course VI: A good percentage of the Class is loafing — forced vacations for the most part. Cliff Harvey tells us he would be grateful for contributions to the poor. Henry Hartwell probably feels the same way, as he, too, is in the electrical engineering bread line. Fred Elser, when last heard from, was on his way to the Pacific Coast, thence to the Philippines. Roger Wilson is near New York, for some unexplained reason. There are a few who haven't had enough and are looking for another ducking. — Earl Cullum, John Hollywood, and Gordon Brown are all looking for a M.S. Earl was in Texas this summer repairing electrical circuits in airplanes. Louie Stander seems to have a job in Detroit. The Secretary has been vacationing with pay on Cape Cod all summer, and suggests that anyone who feels slighted in this letter mention the fact to him immediately at 30 Columbus Avenue, Haverhill, Mass.

Hank Childs and Nels Haskell did time at the summer surveying camp and enjoyed it. Hank is now surveying for H. K. Barrows in Bristol, R. I. (Pay small, enjoyment large.) The last word from Sam Garre — still vacationing in Chatham, Mass.; probably force of habit. Don Holden is doing the Institute again; Buck Moody had similar ideas but headed toward Denver, scenting a job. Pete Cleveland finally made up his last "D" and finished a thesis on "An Investigation of the Points of Inflection of Certain Bridge Portal End Posts." Future plans indefinite. The Secretary invites correspondence addressed to Nelson Haskell, Harvard Business School, D-33 McCulloch, Soldiers Field, Boston.

Hal Genrich is working night and day (he says) under the personal direction of John E. Genrich in Buffalo. He was repeatedly warned against Course XVII, so he has no comeback. — JAMES B. FISK, General Secretary, 4 Story Street, Cambridge, Mass.

## COURSE XV

Greetings! Several of the boys have been in the office recently. Ralph Davis reports that Mr. and Mrs. Ed Hubbard are the proud parents of a baby girl. The youngest Hubbard is probably the class baby. Ralph tells me that he has been traveling around the country quite considerably for the New England Fire Insurance Company and expects to spend the winter in the South — too bad!

Bert Macleod also dropped in the other day. Bert, who is with the Alfred Hale Rubber Company in Quincy, is married.

Miss Dorothy Poland is the lucky girl. — Had a letter from Bob Baxter, who has been transferred from Philadelphia to Syracuse by the Sears Roebuck people. He expects to be in Chicago after the first of the year. — Eddie Abbott has been in the Boston store for the last few weeks.

Gil Roddy reports a fine trip to Europe, where he met Randy Binner. Gil is back at the Institute for graduate work, along with Roy Carlson, Irwin Lord, Jerry Cook, and Art Lutz. — Ran into Bob Snyder the other day. He is still working hard in town. — George Humphreys is also working in town. He is with the Rust Craft Publishers, Inc. — Bill Jacobs is in the chemical specialties line and everything seems to be going great with him.

Let me know of anything of interest to the Class. — JOHN M. MACBRAYNE, JR., Secretary, Room 1-181, M. I. T., Cambridge, Mass.

*The Technology Club of Cincinnati*

It is now the keyhole. At the Tuesday luncheons, Hotel Gibson, Bird of Paradise Room, the crowd grew so big that the large circular table had to have an appendage to take care of the overflow. This shaped table is quite appropriate too, as quite a number of the key men in civic affairs are members of our Club. For instance, there is Henry M. Waite '90, who, as chief engineer of the Cincinnati Union Terminal Company, is pushing the terminal construction to the great advantage of Cincinnati's unemployed, to which end, also, an outstanding contributing factor is J. B. Stewart, Jr., '08, superintendent of the Cincinnati Street Railway Company, now carrying on quite a reconstruction program in the city streets.

Gustave W. Drach '83 is general chairman of the Joint Conference Committee, consisting of members of the A. I. A. and of Allied Construction Industries; Frederick W. Garver '03 is chairman of its Steering Committee, of which Fred Morrill '07 and Walter H. Lee '96 are members, all busy drafting standard specifications for building construction in readiness for the next boom. — Charles Urban '91, as County Commissioner for Hamilton County with his able lieutenant, the county sanitary engineer, John S. Raffety '22, is doing things in sewer work to better conditions in more ways than one.

It is a pleasure to read the frequent press notes accounting for the work of these men of Technology, to which must be added the special commendation given by the Cincinnati Board of Education to work of architect Charles F. Cellarius '16 in the design of the Bond Hill School, and that the preliminary plans for another new city school by Edward H. Kruckemeyer '11 and Charles R. Strong '11 were approved for final action.

The press caused quite a flurry of excitement, too, in local Technology circles, when announcing that Dr. Karl T. Compton, President of Technology, was among the delegates to the National



Research Council inspecting the Basic Science Research Laboratories of the University of Cincinnati, Monday, October 12. Professor Dugald C. Jackson was also mentioned. But disappointment was ours when an eager search developed that neither one had included Cincinnati in this itinerary.

At this time Cambridge advises us of the happy appointment of Charles G. Merrell '88 as honorary secretary to represent the Institute in this district. He is another one of our key men to be found quite frequently at our Tuesday luncheons—at the keyhole. It is the frequent, almost regular attendance of such prominent Institute men that creates a permeating Technology atmosphere and provides an extra tang to the luncheons.—You see and hear things at the keyhole.—WILLIAM V. SCHMIEDEKE, '12, *Secretary*, The Penker Construction Company, 1030 Summer Street, Cincinnati, Ohio.

### *M. I. T. Club of Northern California*

The month of October has been one of a considerable breathing spell for the members of this club. However, this breathing spell was apparently a quiet that followed one period of activity and bred another, for we were making plans to receive Dr. J. L. Tryon, Admissions Officer, in our midst in November. On his arrival in Stockton about the middle of November, a group of local Alumni met him and drove him to Yosemite Valley to spend several days in that natural wonder spot, so much enjoyed by those of us who are situated in the part of the country where we can visit it regularly.

From Yosemite Valley this group drove to Galt, Calif., on November 21 to spend the evening at the beautiful ranch belonging to F. H. Harvey '92. The bulk of entertainment at his ranch consisted of intimate accounts of the great mining history of the State of California with which Colonel Harvey has been so closely identified.

On Sunday, November 28, there was a crusade of Northern California Alumni to Colonel Harvey's ranch, where an outdoor day was spent in the very beautiful surroundings of this part of the country. Wives, children, and sweethearts were all exhibited, in quality as well as quantity, and it proved to be one of the outstanding events of the present year.

The following night our Club held a banquet in San Francisco at the Engineers Club in honor of Dr. Tryon, who was allowed the distinction of providing our entertainment as well as our honorarium. Following this night, Dr. Tryon remained in our midst for several days, during which time we learned much of the Institute and of the methods followed in presenting its merits to prospective students in secondary schools and colleges. While in San Francisco and environs, Dr. Tryon was entertained at the University of California through very thorough arrangements made under the

auspices of E. A. Hersam '91, Professor of Metallurgy at the University. Dr. Tryon was also presented to the leading high schools in the San Francisco Bay District by George R. Norton '07, who is the Institute representative in our territory.

Unfortunately, no news has reached the Secretary during the last month which would indicate that any of our recent members have been appointed as presidents or to membership on boards of directors, but we cannot help believing that this is due to the fact that good news travels slowly. Possibly, considering the fine record of our members as reported in the last issue, this will place our average at a point where we need not expect such announcements in the immediate future.

We hold our regular weekly luncheons at the Engineers Club in San Francisco Tuesday noons, these luncheons being informal and very well attended. We cordially welcome any traveling alumnus or anyone interested in Institute affairs to join us at these pleasant get-togethers. Should such a visitor not obtain details and last-minute information about the Institute, we will promise to substitute in its stead information regarding financial matters, economics, depression, and nearly any other timely subject.—FORREST G. HARMON, '23, *Secretary*, Columbia Steel Company, Room 1428, Russ Building, San Francisco, Calif.

### *Technology Club of Toledo*

We are happy to report that on October 21, the Toledo section of the Alumni of Technology had their first fall meeting, and it was attended by most of the representatives in this territory. Herbert A. Barnby '23 presided and we had a very interesting talk by A. Douglas Nash, formerly of Tiffany Furnaces, on the subject of "Art in Glass." After the meeting the members visited the Libbey Glass Manufacturing Company where they saw in operation the continuous process of making glass tumblers.

The members were all very sorry to learn of the death of Dr. Stratton and all felt that his going is a great loss to the Institute. A letter was sent to Dr. Compton expressing the sympathy of the Toledo Club.—WILLIAM F. DONOVAN, JR., '24, *Secretary*, The Libbey Glass Manufacturing Company, Toledo, Ohio.

### *Washington Society of the M. I. T.*

At the luncheon of the Washington Alumni Society, October 16, Dr. H. W. Tyler gave an account of his recent visit to England, with particular reference to the Centenary Meeting of the British Association for the Advancement of Science held in London in September. This was preceded by a Faraday Celebration and followed by a commemoration of the 100th anniversary of Maxwell's birth.

The Faraday Celebration included meetings in different cities in Great Britain and flood lighting of public

buildings. At the principal meeting in Queens Hall, addresses were made by the Prime Minister and others. An exhibit of electrical appliances, based on Faraday's discoveries, was held in Albert Hall, with a reproduction of his simple laboratory at the Royal Institution.

The first event in the program of the British Association was a reception of delegates from all over the world by the President, General Smuts of South Africa, supported by a distinguished group of past Presidents, including Sir J. J. Thomson, Sir Oliver Lodge, and others. Among the delegates was C. G. Abbot '94, of the Smithsonian Institution. In the extraordinarily varied and interesting program of the following days, one of the most interesting sessions was a discussion meeting of Section A, Mathematics and Physics, on the evolution of the universe. The participants included Jeans and Eddington, of Cambridge; Milne, of Oxford; De Sitter, of Holland; Lemaitre, of Belgium; Millikan, of Pasadena; Lodge, of Birmingham; General Smuts, and the Bishop of Birmingham. The last three, having given the discussion a rather philosophical turn, were courteously reminded by Jeans that it was not a meeting of the British Association, but of the Section of Mathematics and Physics, which they were addressing. The audience at this discussion, which lasted from 10:00 until after 1:00, numbered several thousand.

Dr. Tyler was also present at the unveiling of tablets in Westminster Abbey to Faraday and Maxwell, with a very interesting address by Sir J. J. Thomson, as Master of Trinity College. The distinguished group present at this ceremony included from the United States, Messrs. Millikan, McClenahan, Abbot, and the late Dr. Stratton. A visit to the National Physical Laboratory at Teddington was briefly described.

The high scholastic standing of Arthur Leonard Conn, of Washington, recipient of the 1930 M. I. T. Regional Scholarship Award for the Washington district, was announced and noted with approval; as was the announcement of the 1931 Award to Leonard Stern Weiner, of Washington, D. C.

Members and guests present at the luncheon included: President H. W. Tyler '84, K. P. Armstrong '10, G. E. Marsh '02, C. H. Deetz '89, H. M. Phillips '92, Mrs. H. M. Phillips, A. E. Hanson '14, S. M. Barnette '29, Dwight Clark '97, Allen Pope '07, W. I. Swanton '93, C. L. Saines, Jr. '25, J. A. Plugge '29, and Secretary Houghton '26.—JOSEPH Y. HOUGHTON, '26, *Secretary*, 402 Shepherd Street, Chevy Chase, Md.

### *Worcester County Alumni Association of M. I. T.*

So much time has elapsed since any news of the Worcester County alumni has appeared in The Review that perhaps a short story of its activities will be of interest. The association was formed within the last ten years and began its career with spring meetings at various



country clubs near Worcester. Usually there was an afternoon of golf followed by locker room festivities and a late dinner. In the evening, after singing the Stein Song (which never went very strong, especially on the high notes since Dennie gave up coming to lead it) an address was given by a representative of the Faculty. These addresses were well received and awakened rather lively comment, particularly when Professor Schell threw charts on the screen which showed a direct relation between proficiency in studies and salary received later. In the discussion which followed, one of the older men present called attention to the fact that several members of his class who failed to graduate were now helping to support other members who graduated with honors.

In order to have some more worthy object than springtime good fellowship, the Association started a fund for the purpose of paying the first year tuition of a promising graduate of one of the Worcester County high schools. This has been done for some five or six years and

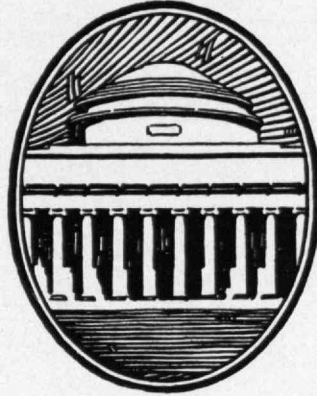
the candidates have been a credit to both their high school and class at the Institute, except in one case where the candidate found the professors were "agin" him and gave good marks only to "greasy grinds" who sacrificed their individuality to follow the professor's ways.

This year the association funds have been affected by the depression but a young man was started just the same. In a spirit of enthusiasm the new President of the association wanted to send two candidates, being inspired by the example of Messrs. du Pont, Swope, Webster, and others. This did not seem feasible as the cost of tuition for two bore the relation of 10 to 1 to the funds available. Nevertheless, two young men were so nearly equally qualified that neither could be wholly turned down. Finally, Howard Stewart, who although no longer President, is carrying the greater part of the load in running the association co-extensive with the alumni enrollment in Worcester County. A reasonable degree of success in the effort will stimulate interest in the Institute

among high schools, and also make it possible to carry on the scholarship without appealing for donations from a few generous members who are paying over half the bill.

Plans are also being made to have a more lively spring meeting. There has not been a rousing good time since Fred Dillon's orchestra played "Linger a While" at the Oak Hill Country Club. This lack will be remedied by putting Arthur Brockelman in charge of the ceremonies. Arthur can make things hum even at a church social.

Ted Packard, the Secretary of the association, is so busy getting Worcester County blacksmiths to come to the meetings of the American Society for Steel Treating, of which he is also secretary, that he asked the President to write this notice, he having written one last spring which was lost on a detour of the new state road from Worcester to the Institute. His address is American Steel and Wire Company, Worcester, Mass. — CLARENCE M. JOYCE, *President*, 145 Walnut Street, Leominster, Mass.



# INFORMATION

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**T**HE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

*Ask for the following circulars by their descriptive letters:*

**AB:** For general information, admission requirements, subjects of instruction, ask for Bulletin AB.

**C:** For announcement of courses offered in Summer Session, ask for Bulletin C.

**D:** For information on Advanced Study and Research Work, ask for Bulletin D.

**E:** For the reports of the President and of the Treasurer, ask for Bulletin E.

**Y:** For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

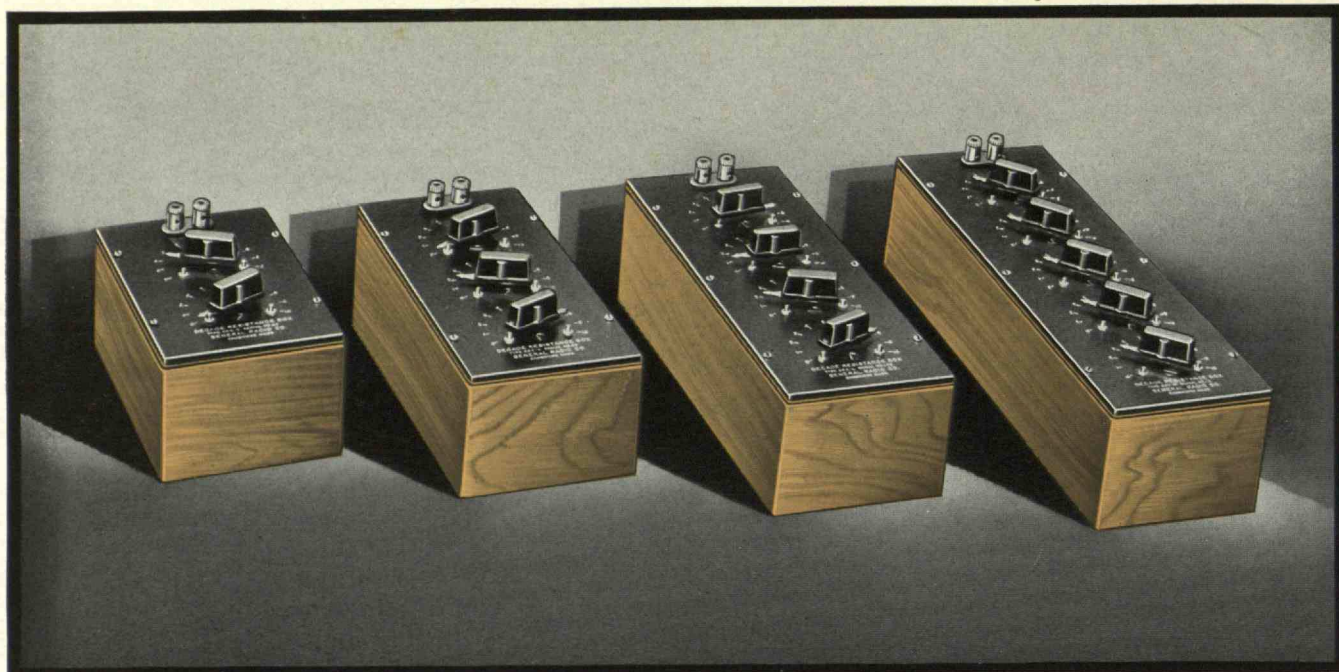
*All inquiries sent to the address below will receive prompt attention*

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## THE TECHNOLOGY REVIEW BUREAU

ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
CAMBRIDGE, MASSACHUSETTS



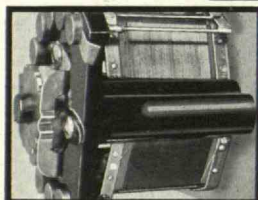
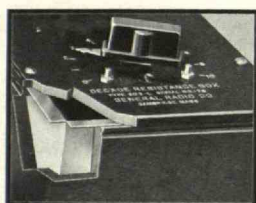


# ANNOUNCING New Resistance Boxes for High Frequencies

## ◆ FEATURES ◆

### SHIELDING

Protection against stray electric fields and dust are provided by the aluminum panel and the copper-lined cabinet

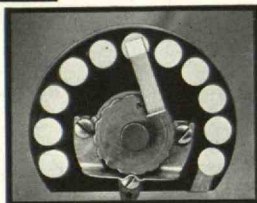


### NEW RESISTORS

Resistors of 1000 ohms and above are wound on thin mica cards and aged. This method minimizes reactance with good mechanical and electrical stability

### LOW SWITCH RESISTANCE

A rugged detent device and large contact surfaces on the switch yield a marked improvement in performance over conventional designs



**T**HE measurement of resistance enters into many audio- and radio-frequency problems, and accurately calibrated resistance boxes are, consequently, essential equipment for every laboratory which has anything at all to do with communication-frequency measurements.

A suitable resistance box for such work must have three very important qualities:

- (a) The individual resistors must be stable electrically and mechanically so that calibrations can be made and depended on.
- (b) The resistance introduced by the switches must be low and fixed.
- (c) There must be an absolute minimum of capacitance and inductance, since even a relatively small amount of either effect makes the calibration of the box a function of frequency.

The Type 102 Decade-Resistance Boxes built by General Radio for the past few years have been entirely satisfactory in all three respects, but in the course of our development work means were discovered for making an appreciable improvement in both the mechanical and electrical characteristics. The new Type 602 Decade-Resistance Boxes are the result.

A new method of winding the high-resistance units was worked out which materially reduced the residual capacitance and inductance effect without sacrificing stability. As a result the new boxes can be used at higher frequencies.

The switches were mounted beneath the panel where they are protected from the ravages of dust and corrosion. Hence, the new boxes have a lower and more nearly constant switch resistance. The action of the switches is smoother and more positive, and they will wear longer.

Shielding, furnished by the metal panel and the copper lining of the cabinet was introduced to minimize the effects of stray electric fields from other apparatus.

The new boxes, like the older models, have an individual resistance card for each step in a decade. This makes it possible to furnish each switch with eleven points (0 to 10 inclusive), a big help when working near the end of a decade.

● We suggest that you investigate these new boxes. Prices range from \$25.00 to \$70.00, several sizes being lower in price than previous boxes. Write for a copy of the new Catalog F, Part 3, in which they are described. Address:

GENERAL RADIO COMPANY, CAMBRIDGE A, MASSACHUSETTS



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